

Appendix 2BB
GEOTECHNICAL BORING LOGS



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-01	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 2 ft bgs on 03/15/07 START : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitley

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
41.6							"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water at 6' below ground surface
3.5							
5	1.0	SS-1	5-4-3 (7)	Poorly Graded Sand With Silt (SP-SM) 3.5-4.5' - very pale orange to moderate yellowish brown, (10YR 8/2 to 10YR 5/4), wet, loose, very fine to fine grained, 10-15% fines, nonplastic, <10% root matter and organic material, trace concretions up to 1/4", very fine silica sand and silt in an iron matrix			Few dense lenses from 5.0-8.5', thin, relatively consistent drilling rate (moderately rapid)
36.6	5.0						
8.5							
10	0.5	SS-2	9-50/5 (59/11")	Limestone Fragments 8.5-8.75' - very pale orange, (10YR 8/2), strong HCl reaction, gravel-sized, subrounded to angular, up to 1"x1-1/2" Silt (ML) 8.75-9.0' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 10-15% very fine to medium grained sand, all carbonate derived			Very hard from 9.0-12.5', possible limestone lenses, light chatter, extremely slow advancement rate
31.6	9.4						
13.5							
15	0.8	SS-3	27-17-4 (21)	Silt With Limestone Fragments (ML) 13.5-14.3' - very pale orange, (10YR 8/2), wet, very stiff, nonplastic, mild to moderate HCl reaction, 10-15% very fine to fine grained sand, 3 limestone lenses (<1/2") at 13.5', 13.7' and 14.0', all carbonate derived			Relatively consistent from 12.5-28.5', moderately rapid drilling rate
26.6	15.0						
18.5							
20	1.3	SS-4	40-54-50 (104)				SS-4 actual sample depth is 18.5-20.0'
20.0	20.0						



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

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	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
21.6					Sandy Silt (ML) 18.5-19.75' - very pale orange, (10YR 8/2), moist, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 35-40% very fine to fine grained sand, all carbonate derived		
23.5	1.5	SS-5	17-24-31 (55)		Sandy Silt With Limestone Fragments (ML) 23.5-25.0' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 20% fine to coarse gravel, limestone fragments are extremely weak rock (R0); similar to 18.5-19.75'		
25 16.6							
28.5	0.8	SS-6	34-50/3.5 (84/9.5")		Silty Sand With Limestone Fragments (SM) 28.5-29.25' - Same as 23.5-25.0' except 72% fine to medium grained sand, interbedded with limestone lenses (<1/2") at 28.5-28.8' and intermittent throughout		Slow advancement rate from 28.5-33.5' with several dense lenses <0.5' thick, associated with light chatter
29.3							
30 11.6							
33.5 33.7	0.2	SS-7	50/2.5 (50/2.5")		Limestone Fragments 33.5-33.7' - grayish orange to dusky yellowish brown, (10YR 7/4 to 10YR 2/2), mild to moderate HCl reaction, gravel-sized limestone fragments up 1-1/2" diameter, sample includes 1/2" thick iron cemented lenses that have no HCl reaction		
35 6.6							
38.5	1.1	SS-8	28-35-50/1 (85/7")				
39.6							Extremely dense from 39.0-46.0', slow drilling with light to heavy rig chatter
40							



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DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
21.6					Sandy Silt (ML) 18.5-19.75' - very pale orange, (10YR 8/2), moist, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 35-40% very fine to fine grained sand, all carbonate derived		
23.5							
25	1.5	SS-5	17-24-31 (55)		Sandy Silt With Limestone Fragments (ML) 23.5-25.0' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 20% fine to coarse gravel, limestone fragments are extremely weak rock (R0); similar to 18.5-19.75'		
16.6							
25							
28.5							
29.3	0.8	SS-6	34-50/3.5 (84/9.5")		Sandy Silt With Limestone Fragments (ML) 28.5-29.25' - Same as 23.5-25.0' except 40% fine to medium grained sand, interbedded with limestone lenses (<1/2") at 28.5-28.8' and intermittent throughout		Slow advancement rate from 28.5-33.5' with several dense lenses <0.5' thick, associated with light chatter
30							
11.6							
33.5							
33.7	0.2	SS-7	50/2.5 (50/2.5")		Limestone Fragments 33.5-33.7' - grayish orange to dusky yellowish brown, (10YR 7/4 to 10YR 2/2), mild to moderate HCl reaction, gravel-sized limestone fragments up 1-1/2" diameter, sample includes 1/2" thick iron cemented lenses that have no HCl reaction		
35							
6.6							
38.5							
39.6	1.1	SS-8	28-35-50/1 (85/7")				Extremely dense from 39.0-46.0', slow drilling with light to heavy rig chatter
40							



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SOIL BORING LOG		

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DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
	1.6					
43.5				Sandy Silt With Limestone Fragments (ML) 38.5-39.58' - olive gray to light olive gray, (5Y 3/2 to 5Y 5/2), wet, hard, low to medium plasticity, slow to rapid dilatancy, moderate to strong HCl reaction, 35% fine to coarse grain sand, trace organic content, limestone interbeds at 38.5-38.7' and intermittently throughout		
43.8	0.3	SS-9	50/3 (50/3")	Limestone Fragments 43.5-43.75' - light olive gray, (5Y 6/1), mild HCl reaction, very fine to fine gravel, up to 3/4"x1/2"		
45 -3.4						
48.5	0.3	SS-10	28-50/2 (78/8")	Silty Sand (SM) 48.5-48.8' - yellowish gray, (5Y 8/1), wet, very dense, 30% fines, nonplastic, mild to moderate HCl reaction, fine to medium grained sand, 10% gravel-sized limestone fragments Begin Rock Coring at 49.0 ft bgs See the next sheet for the rock core log		Split spoon sample SS-10 actually advanced 48.5-49.2
50 -8.4						
55 -13.4						
60						



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ROCK CORE LOG		

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DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
49.0			0					
50 -8.4	R1-NQ 2.5 ft 88%	42	>10	49.55-49.65, 50.2-50.3' - Fracture zone (2), rough, undulating, with 1" openings		Limestone 49.0-51.2' - dark yellowish brown, (10YR 4/2), fine grained, extremely weak to very weak (R0 to R1), voids (<3/16") over 70% of surface except from 49.65-50.2' where voids (<1/16") cover <20% of surface, fossiliferous, cavities <1/2"x1/4" over <15% of surface, trace organics No Recovery 51.2-51.5' Limestone 51.5-56.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 60-80% of surface, few cavities <1-1/2"x1" concentrated at 53.8', fossiliferous	Switch to NQ rock coring tooling at 49.0', drive HW casing to 49', seat casing in <6" rock, flush casing with 3-7/8" tricone bit R1: 5 minutes	
51.5		NR	2	50.45' - Mechanical break or fracture, 40 deg, rough, undulating, open <3/4" 50.75, 50.9' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, open <1/2"				
55 -13.4	R2-NQ 5 ft 98%	82	0	53.0' - Mechanical break or fracture, <10 deg, rough, stepped to undulating, tight 53.8' - Mechanical break or fracture, <10 deg, rough, undulating, tight at fracture with associated cavity 54.4' - Mechanical break 55.0, 55.1' - Fractures, 35 deg, rough, undulating, tight			R2: 10 minutes	
56.5			NR	56.0, 56.2' - Mechanical break or fractures, <10 deg, rough, undulating, open <1/2" 56.5-56.8' - Fracture zone, rough, undulating, gravel-sized (<1-1/2"x1"), open 57.0, 57.3, 57.5' - Fractures (3), 50-90 deg, smooth, undulating, intersecting fractures, tight		No Recovery 56.4-56.5' Limestone 56.5-60.4' - pale yellowish brown, (10YR 6/2), fine grained, very weak to medium strong (R1 to R2), voids (<3/16") over 85% of surface, fossiliferous, trace organics, extremely weak rock (R0) zones at 56.5-56.8', 58.7', 58.85', 59.5', 59.75-60.0'	Water level at 1' below ground surface at 17:30, end drilling on 03/14/07 Water level at 2' below ground surface on 03/15/07 07:30	
60 -18.4	R3-NQ 5 ft 78%	48	2	58.7, 58.85, 59.5' - Bedding plane or mechanical break (3), smooth, undulating, tight 58.95' - Mechanical break 59.75-60.0' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter, open				
61.5			NR	61.3' - Bedding plane or mechanical break, rough, undulating, broken along weak bedding planes, tight		No Recovery 60.4-61.5'	R3: 16 minutes	
65 -23.4	R4-NQ 5 ft 99%	98	0	63.15' - Bedding plane, horizontal, rough, undulating, tight 63.5, 63.7, 63.95, 64.0, 64.05, 64.4, 64.45, 65.2' - Mechanical break (8)				
66.5			NR	66.7, 67.5, 68.2, 68.5, 70.2, 70.3, 70.55' - Mechanical break or bedding plane (7), <10 deg, rough, undulating, <1/4" openings 67.3' - Fracture, 70 deg and vertical, rough, stepped to undulating, tight		No Recovery 66.45-66.5'	R4: 8 minutes Driller's Remark: Slight fluid loss in zone	
	R5-NQ		3					



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ROCK CORE LOG		

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DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
70 -28.4	5 ft 92%	62	0	69.45' - Fracture, 60 deg, smooth, undulating, tight	Limestone 66.5-71.1' - pale yellowish brown, (10YR 6/2), very fine to fine grained, very weak to weak (R1 to R2), voids up to 3/16" over 80% of surface, fossiliferous, trace laminated organics, very weak rock to weak rock at 66.5-67.0' and 70.0-71.1', medium strong rock (R3) at 69.0-70.0' No Recovery 71.1-71.5' Limestone 71.5-76.3' - pale yellowish brown, (10YR 6/2), very fine to fine grained, weak (R2) to medium strong (R3) at 71.5-72.3', 72.7-73.7', and 74.2-74.7' with voids (<3/16") over 80% of surface; extremely weak (R0) to very weak (R1) at 72.3-72.7' and 73.7-74.2' with voids (<3/16") over 30% of surface; extremely weak (R0) to very weak (R1) interbeds from 74.7-76.0'; all fossiliferous No Recovery 76.3-76.5' Limestone 76.5-79.5' - moderate yellowish brown to very light gray, (10YR 5/4 to N8), very fine to fine grained, weak to medium strong (R2 to R3), except extremely weak (R0) to very weak (R1) rock at 78.1-78.3' and 79.5-79.85'; 76.5-78.3' and 79.85-80.35' - 80% voids <3/16", fossiliferous (molds, casts); 78.3-79.0' - >90% voids <3/16", 30-40% cavities up to 1/2"x1/4", highly fractured zone; 79.0-79.5' - <20% voids <3/16", medium strong rock (R3) Lean Clay - Elastic Silt (CL-ML) 79.5-79.85' - medium plasticity, slow dilatancy, strong HCl reaction No Recovery 80.35-81.5' Limestone 81.5-86.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 60-80% of surface at 81.5-83.0' and 84.5-86.0', fossiliferous (molds <1/2"x1/4"), dissolution cavities up to 2"x1/2" at 82.3', 84.65-84.8', 84.9-85.15' and 85.6-86.65'	R5: 7 minutes	
75 -33.4	R6-NQ 5 ft 96%	50	2	72.35' - Bedding plane, <10 deg, rough, undulating, 1/4" soil seam infill, open 1/2" 72.6, 72.85, 72.95' - Bedding plane or mechanical break (3), <10 deg, rough, undulating, tight 73.7' - Mechanical break or bedding plane, 15 deg, rough, undulating, open 1/4" 74.1' - Mechanical break or bedding plane, horizontal, smooth, undulating, 1/4" infill, open 1/4" 74.8-75.2 and 75.5-76.0' - Clay seams (2), smooth, undulating, extremely weak rock (R0) zones		R6: 7 minutes	
80 -38.4	R7-NQ 5 ft 77%	28	>10	77.0, 77.3' - Fractures (2), 60 deg and 50-90 deg, rough, stepped to undulating, tight 77.95, 78.15, 78.3' - Fractures (3), <10 deg, rough, stepped to undulating, tight 78.65-79.0' - Fracture zone, rough, stepped to undulating, dissolution zone, angular to subangular gravel-sized fragments <1" diameter 79.2' - Fracture, vertical, smooth, undulating, tight 79.35, 79.5' - Fractures (2), rough, undulating, silt and/or clay sized infilling, tight 79.5-79.65' - Clay seam, 4-1/2" silt and/or clay sized infilling, Elastic Silt (MH) to Lean Clay (CL), moderate plasticity, low dilatancy, strong HCl reaction 79.85' - Bedding plane, smooth, undulating, tight		03/20/2007 set NW casing to 80' to free NQ tooling 03/21/2007 continue rock coring from 81.5' below ground surface, 100% circulation with NW casing at 80' below ground surface R7: 10 minutes	
85 -43.4	R8-NQ 5 ft 90%	76	1	81.5-81.7' - Fracture zone, rough, undulating, gravel sized fragments <1/2" diameter, angular to subangular 82.25' - Fracture, 0-40 deg, rough, undulating, open <1" 83.6' - Bedding plane, <10 deg, rough, undulating, tight 84.0' - Mechanical break 84.65-84.8' - Fracture zone, horizontal and 20 deg, rough, undulating, fragmented rock, angular gravel sized fragments <1" diameter, open <2" 84.95' - Mechanical break, rough, undulating, open <1/2" 86.75-86.95' - Fracture zone, rough, undulating, angular gravel sized fragments <1-1/2" diameter, 2-1/2" open		SC-1 collected at 84.95-86.0' R8: 9 minutes	
	R9-NQ						



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ROCK CORE LOG		

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DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
90 -48.4	5 ft 98%	80	1	89.0' - Bedding plane, <10 deg, rough, undulating, open 1/4"	[Symbolic Log]	Limestone 83.0-84.5' - mild to moderate HCl reaction, mottled with zones of bioturbation having a secondary infill of a very fine, medium strong rock (R3) matrix, voids (<3/16") over 30% of surface, secondary infilling of bioturbated zone consisting of 20-30% of surface, trace fossil molds No Recovery 86.0-86.5' Limestone 86.5-87.05' - moderate yellowish brown to very light gray, (10YR 4/2 to N8), very fine to fine grained, extremely weak to very weak (R0 to R1), grayish blue mottling (5PB 5/2), voids (3/16") over 60-80% of surface from 84.5-86.0' and fossiliferous with trace organics 87.05-89.15' - Same as 86.5-87.05' except very light gray (N8) and grayish blue (5PB 5/2) mottling, voids (3/16") over 50-60% of surface, fossiliferous (microfossils) 89.15-90.7' - fine grained, very weak (R1), voids (<3/16") over 30-50% of surface, moderately fossiliferous 90.7-91.4' - Same as 86.5-87.05' except no mottling No Recovery 91.4-91.5' Limestone 91.5-96.4' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained, extremely weak to weak (R0 to R2) 91.55-91.85' - fine grained, very weak (R1), voids (<3/16") over 30-50% of surface, fossiliferous 91.85-94.6' - moderate HCl reaction, voids (<3/16") over 60-80% of surface, moderately fossiliferous (molds up to 1/2" x 1/4"), few cavities <1/2" diameter, trace organics 94.6-96.4' - strong HCl reaction, gradual transition to >30% voids up to 1/16", 1/4" diameter cavity with medium light gray (N6) clay infill No Recovery 96.4-96.5' Limestone 96.5-101.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 70-80% of surface, moderately fossiliferous (molds <1/2"x1/4"), trace organics; 1/2" silt seam at 98.0', slow to fast dilatancy, low plasticity, carbonate material	R9: 11 minutes	
			0					
			2	90.95' - Bedding plane, horizontal, smooth, undulating, open <1/4"				
			NR	91.25' - Mechanical break or bedding plane, 15 deg, rough, undulating, tight				
			1	91.6' - Bedding plane, horizontal, smooth, undulating, tight				
			0	92.9' - Mechanical break				
			3	93.85-93.95' - Fracture zone, rough, undulating, 3 fractures, open <1-1/2"				
			1	95.3' - Fracture, 75 deg, smooth, undulating, tight				
			4	95.85-95.9' - Clay seam, horizontal, smooth, undulating, 3/4" clay infilling, Fat Clay (CH), medium gray (N5), moist, soft, high plasticity				
			NR	96.05, 96.35' - Mechanical break or bedding plane (2), <10 deg, rough, undulating, tight				
95 -53.4	R10-NQ 5 ft 98%	82	2	96.85, 97.55' - Bedding plane, <10 deg, rough, undulating, tight	[Symbolic Log]		R10: 16 minutes	
			1	97.05, 99.0, 99.75, 101.05, 101.4' - Mechanical break (5)				
			0	98.0' - smooth, undulating, <1/2" silt and/or clay sized infilling				
			0					
			0					
			1	101.55, 102.65, 103.75' - Bedding plane or fractures (3), horizontal, smooth, undulating, tight				
			1					
			1	104.0, 104.85' - Mechanical break				
			0					
			>10	105.5-105.6' - Fracture zone, rough, undulating, gravel sized fragments, <1" diameter				
100 -58.4	R11-NQ 5 ft 100%	98	NR		[Symbolic Log]		R11: 8 minutes	
			0					
			1					
			0					
			0					
			1					
			1					
			1					
			1					
			1					
105 -63.4	R12-NQ 5 ft 96%	86	0		[Symbolic Log]		R12: 3 minutes	
			>10					
			NR					
			0					
			1					
			0					
			1					
			0					
			1					
			1					
106.5	R13-NQ		0		[Symbolic Log]			
			1					
			0					
			1					
			0					
			1					
			0					
			1					
			0					
			1					



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

WATER LEVELS : 2 ft bgs on 03/15/07 START : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -68.4	5 ft 100%	70	4	108.65' - Fracture, 75 deg, smooth, undulating, tight	Limestone 101.5-106.3' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids (<1/16") over 50% of surface, few cavities up to 1/2"x1/4", poorly to moderately fossiliferous; 105.6-106.05' weak rock (R2) zone, voids (<3/16") over 70% of surface, moderately fossiliferous, moderate HCl reaction at 105.6-106.05' No Recovery 106.3-106.5' Limestone 106.5-111.5' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained, strong HCl reaction, very weak (R1), voids (<3/16") over 60-80% of surface, moderately to highly fossiliferous (molds <1/4" diameter) concentrated at 106.5-107.7' and 110.0-110.3', surface iron staining at 106.8', 107.8' and 109.5' 111.5-116.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak (R1), 40% voids to <1/16", poorly to moderately fossiliferous (molds <1/16"), iron staining at 113.8', 114.6' and 115.7' 116.5-119.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 60% of surface, poorly to moderately fossiliferous (molds <1/2"x1/4") 119.0-121.35' - Same as 116.5-119.0' except 80% voids up to 3/16", few cavities up to 1/2" diameter, highly fossiliferous (molds <1/2") No Recovery 121.35-121.5' Limestone 121.5-122.65' - Same as 119.0-121.35' 122.65-124.0' - pale yellowish brown, (10YR 6/2), very fine to fine grained, very weak (R1), voids (<1/16") over >50% of surface, poorly fossiliferous (molds up to 1/4" diameter), few cavities up to 1/2"x1/4" 124.0-126.5' - Same as 122.65-124.0' except voids up to 3/16" over 60-80% of surface, extremely weak rock (R0), highly fossiliferous below 125.75', friable	R13: 10 minutes	
			4	109.1, 109.15, 109.25' - Fractures (3), 90, 30, 50 deg, smooth to rough, undulating, intersecting fractures from 108.7-109.5'			
			3	109.65' - Fractures, 65 deg and 70 deg, rough, undulating, tight			
			0	110' - Fracture, 75-85 deg, rough, undulating, tight, intersecting			
			0	110.5-110.65' - Fracture zone, 50 deg and 70 deg, rough, undulating, open <1-1/2"			
115 -73.4	R14-NQ 5 ft 100%	100	0	113.35, 114.0, 114.2, 115.2, 116.25, 116.5' - Mechanical break (6)			
			0				
			0				
			0				
			1	116.6' - Bedding plane, horizontal, smooth, undulating, tight			
			0				
120 -78.4	R15-NQ 5 ft 97%	92	0	118.85, 119.85' - Mechanical break (2)			
			0				
			2	120.5-120.6' - Fracture zone, 25 deg and horizontal, rough, undulating, intersecting, open <1"			
			NR				
			1	121.9' - Bedding plane, horizontal, smooth, undulating, tight			
			0				
125 -83.4	R16-NQ 5 ft 100%	84	0				
			0				
			>10	125.75-126.5' - Fracture zone, rough, undulating, gravel sized fragments <3"x1-1/2"			
			2				
			1	127.25, 127.45, 127.7, 131.3' - Bedding plane, horizontal, smooth, undulating, tight			
	R17-NQ			128.7, 129.0' - Mechanical break (2)			



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 ORIENTATION : Vertical
 WATER LEVELS : 2 ft bgs on 03/15/07 START : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
130 -88.4	5 ft 100%	87	0		Limestone 126.5-131.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 60% of surface, poorly to moderately fossiliferous, few cavities <1/2" diameter, trace secondary infill of cavities, laminated bedding at 127.2', 127.85' and 128.95' 131.5-136.5' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to medium strong (R1 to R3), 131.5-132.95' - voids <3/16" over 40% of surface, poorly fossiliferous (molds <1/2" diameter); 132.95-136.5' - voids up to 3/16" over 70% of surface, highly fossiliferous (molds <1/2"), molds over 30-50% surface 136.5-141.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, strong HCl reaction, very weak to medium strong (R1 to R3), laminated bedding, 30-60% voids up to 3/16", poorly to moderately fossiliferous (molds <1/2"x1/4"), surface iron staining at 136.7', 137.7', 138.2', 139.1' and 140.5', laminated throughout No Recovery 141.2-141.5' Limestone 141.5-145.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained, 141.5-142.0' - moderate yellowish brown, very weak to weak rock (R1-R2), voids (<3/16") over 70% of surface, moderately fossiliferous, trace organics, trace laminated bedding; 142.0-145.0' - voids up to 3/16" over 50% of surface, medium strong rock (R3), highly fossiliferous (molds <1"x1/2"), cavities <1.5"x1", several cavities with secondary mineral infill, heavily bioturbated No Recovery 145.0-146.5'	R17: 5 minutes	
			0				
			1				
			0				
			0	133.05, 134.0, 135.2' - Mechanical break (3)			SC-4 collected at 133.05-134.0'
	R18-NQ 5 ft 100%	100	0				
135 -93.4			0				
			0				R18: 10 minutes
			1				
			2	137.5' - Bedding plane, horizontal, smooth, undulating, tight			
	R19-NQ 5 ft 94%	86	1	138.05, 138.45, 138.6' - Bedding plane, <10 deg, rough, undulating, tight			
140 -98.4			0				
			>10			R19: 8 minutes	
			NR	140.9-141.2' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter			
			>10	141.6-142.0' - Bedding plane (>10), <10 deg, smooth to rough, undulating, open <1/4"			
			>10	142.0-142.65' - Fracture zone, rough, undulating, angular gravel-sized fragments <1-1/2" diameter			
	R20-NQ 5 ft 70%	23	4	142.9, 143.3, 143.65, 144.15, 144.25, 144.5, 144.7' - Fractures (8), <10 deg, rough, undulating, <1/2" openings			
145 -103.4			>10	144.7-145.0' - Fracture zone, rough, undulating			
			NR			Core barrel malfunction from 144.7-145.0' due to rock fragments wedged in bit R20: 10 minutes	
			2	146.6' - Bedding plane, <10 deg, rough, undulating, open <1/4"			
			1	146.8, 147.8' - Bedding plane (2), horizontal, smooth, undulating, tight			
	R21-NQ						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-01	SHEET 9 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
 WATER LEVELS : 2 ft bgs on 03/15/07 START : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -108.4	5 ft 86%	80	1	148.95' - Bedding plane, horizontal, rough, undulating, open <1/4"	Limestone 146.5-150.8' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, laminated bedding, 146.5-148.9' - weak to medium strong rock (R2-R3), voids (<3/16") over 30% of surface, voids increase to 80% from 148.3-148.9' 148.9-150.8' - very weak rock (R1), voids (up to 3/16") over 60% of surface, moderately fossiliferous (casts) concentrated at 148.9-150.0 No Recovery 150.8-151.5' Limestone 151.5-153.45' - Same as 148.9-150.8' except very weak (R1) Silty Sand (SM) 153.45-153.55' - wet, loose, silt has rapid dilatancy, 50% fine to medium grained sand, calcareous, 1/4" thick lense Limestone 153.55-156.5' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, medium strong (R3), 50-70% voids up to 3/16", poorly to moderately fossiliferous, laminated bedding concentrated at 155.0-156.5', few cavities <1/2"x1/4", 1 large (3/4"x1/2") cavity at 156.4' 156.5-161.5' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate to strong HCl reaction, weak to very weak (R2 to R1), 60% voids up to 3/16", moderately fossiliferous (molds 3/4"x1/2" diameter), trace organics, trace secondary infill and silt-sized carbonate material at 158.35-158.5' and 160.5', medium strong rock (R3) lense at 158.7-159.7', laminated bedding at 156.5-156.9' and 160.5-160.9' Bottom of Boring at 161.5 ft bgs on 3/21/2007	R21: 13 minutes	
			0				
			0				
			NR				
155 -113.4	R22-NQ 5 ft 100%	92	1	151.85' - Bedding plane, horizontal, rough, undulating, tight			SC-5 collected 151.85-152.8'
			1				
			0	153.45-153.55' - Clay seam or bedding plane, horizontal, smooth, undulating, 5/8" silt and/or clay sized infilling, tight			
			0				
			2	155.65, 156.35' - Bedding plane (2), <10 deg, smooth, undulating, tight			R22: 14 minutes
160 -118.4	R23-NQ 5 ft 100%	92	3	156.7, 156.8, 156.9' - Bedding plane (3), <10 deg, smooth, undulating, tight			
			0				
			0	158.35, 158.6, 159.7' - Mechanical break (3)			
			0				
			1	160.65' - Bedding plane, <10 deg, smooth, undulating, tight		R23: 7 minutes	
						Water level at 5' below ground surface on 3/21/2007 at 18:30	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 1 OF 13
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.5 ft bgs on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitley

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
41.6	0.0	1.1	SS-1	2-2-4 (6)	Poorly Graded Sand With Organics (SP) 0.0-0.2' - grayish black, (N2), moist, loose, very fine to fine grained, no HCl reaction, sand is silica, trace nonplastic fines, 20% fine organics Poorly Graded Sand (SP) 0.2-1.1' - medium light gray, (N6), moist, loose, very fine to fine grained, sand is silica, trace nonplastic fines, 10% organics and roots	"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water level at 1.5' below ground surface SS-1 collected with hammer only, hammer stem is AWJ rod, NWJ used below SS-1 6" tri-cone roller bit used with mud rotary to open bore hole, rapid drilling from 0-10' below ground surface	
	1.5						
5 36.6	5.0	0.9	SS-2	3-4-7 (11)	Silty Sand (SM) 5.0-5.9' - light olive gray, (5Y 6/1), wet to moist, medium dense, slow dilatancy, no HCl reaction, fine sand, 22% low plasticity fines		
	6.5						
10 31.6	10.0	0.3	SS-3	50/3 (50/3")	Silt With Sand (ML) 10.0-10.25' - dusky yellow, (5Y 6/4), wet, hard, low to medium plasticity, rapid dilatancy, mild to moderate HCl reaction, 25% sand sized grains, trace iron-rich concretions at 10.25', carbonate material with some silica grains (possibly slough)	Extremely slow drilling rate 10.0-14.5'	
	10.3						
15 26.6	15.0	1.3	SS-4	21-30-25 (55)	Silt (ML) 15.0-16.3' - moderate yellow, (5Y 7/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 14% fine to medium sand sized grains, carbonate derived	Rapid drilling 14.5-20'	
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 2 OF 13
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.5 ft bgs on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
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), mild HCl reaction, rock fragments to 1/2" with 60% coverage of voids to 1/16"		Slow drilling, trace light chatter 20-21' Rapid drilling with intermittent dense zones 21-35'
25	25.0						
16.6	25.4	0.4	SS-6	50/5 (50/5")	Silt With Interbedded Limestone Lenses (ML) 25.0-25.4' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, limestone lenses <1/2" thick, voids <1/16" over 70% of limestone surface		
30	30.0						
11.6	31.3	1.0	SS-7	15-30-50/3 (80/9")	Silty Sand (SM) 30.0-31.0' - dark yellowish orange, (10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 49% nonplastic fines, 1" thick limestone lense at 30.4', few limestone lenses <1/4" thick interbedded throughout, carbonate derived		
35	35.0						
6.6	36.0	0.8	SS-8	15-50/2.5 (65/11.5")	Silty Sand (SM) 35.0-35.8' - Same as 30.0-31.0' except a few siltier lenses <1/2" thick, no limestone lenses		Moderate to heavy chatter increasing with depth, moderate to slow drilling 35-40'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 3 OF 13
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.5 ft bgs on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
1.6	40.0	0.1	SS-9	50/1 (50/1")	Limestone Fragments 40.0-40.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate to mild HCl reaction, fragments <1-1/2" x 1/2" in size		Drilling stops at 17:30 on 03/22/2007 Water/mud level 0.5' below ground surface at 07:30, 3/23/07 Continue drilling from 40' with mud rotary NWJ rod and 6" tri-cone bit at 08:00 on 03/23/2007 Extremely slow drilling, light to moderate chatter 40-44' 44.0-45.0' Drill rate increases slightly 40-44'
45 -3.4	45.0	1.3	SS-10	37-50-48 (98)	Sandy Silt (ML) 45.0-46.3' - light olive gray, (5Y 5/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 48% fine to coarse grained sand		Rapid drill rate 45-55'
50 -8.4	50.0	1.3	SS-11	12-24-30 (54)	Sandy Silt With Gravel (ML) 50.0-51.3' - moderate olive brown, (5Y 4/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 30% sand sized grains, 20% gravel sized grains, few extremely weak (R0) rock limestone lenses <1/2" thick, carbonate derived		
55 -13.4	55.0	0.8	SS-12	50-50/3 (100/9")	Sandy Silt With Gravel And Limestone (ML) 55.0-55.5' - Same as 50.0-51.3' except moderate yellowish brown, (10YR 5/4), limestone fragments <1-1/2" x 1/2" thick Silt (ML) 55.5-55.8' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 10-15% very fine to fine sand sized grains, carbonate derived Begin Rock Coring at 56.5 ft bgs See the next sheet for the rock core log		HW casing set to 55', clean out casing with 3-7/8" tri-cone to 56' Rock coring begins at 56.5', no sampling from 56.0-56.5'
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 4 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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
56.5	R1-NQ 5 ft 86%	74	1	57.1' - Fracture, 30 deg, smooth, undulating, <1/4" open	[Symbolic Log Pattern]	Limestone 56.5-60.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids (<3/16") over 70% of rock surface from 56.5-58.2', voids (<3/16") variable from trace to 50% of rock surface from 58.2-60.8', trace organics, moderately fossiliferous, few molds/casts <1/4", many molds/casts <3/16" 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 (R1) No Recovery 60.8-61.5' Limestone 61.5-66.0' - moderate HCl reaction, extremely weak to medium strong (R0 to R3), trace organics throughout, organic lense at 62.9' <1-1/2" thick (laminated), voids (<3/16") over 70% of surface from 61.7-63.7', voids (<1/16") over 20% of surface from 63.7-66.0', moderately fossiliferous with molds <3/16", few cavities (1" x 1/2") 61.5-61.7; 62.9-63.7' - extremely weak to very weak (R0 to R1) 61.7-62.9; 64.2-66.0' - weak to medium strong (R2 to R3) No Recovery 66.0-66.5' Limestone 66.5-71.4' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction, very weak to medium strong (R1 to R3), trace laminated bedding, trace organics, voids (<3/16") variable for 0-50% of rock surface, poorly fossiliferous 66.5-68.4, 70.0-71.5' - very weak (R1) 68.4-70.0' - weak to medium strong (R2 to R3) No Recovery 71.4-71.5' Limestone 71.5-72.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 40-50% of rock surface, fossiliferous with molds <1/4", trace secondary infilling	R1: 13 minutes
60 -18.4			1				
			2	58.35, 58.5, 58.75' - Fractures (3), <10 deg, rough, undulating, <1/4" open 58.95' - Mechanical break			
			2	59.85' - Fracture (2), 60 deg and 30 deg, smooth, undulating, intersecting fractures			
			0				
61.5	R2-NQ 5 ft 90%	76	NR			R2: 11 minutes	
			2	61.7' - Fracture, <10 deg, rough, undulating, <1/2" open 62.1' - Fracture, 15 deg, rough, undulating, <1" open			
			>10	62.6' - Fracture, 70 deg, smooth, undulating, tight			
			1	62.9' - Fracture, <10 deg, rough, undulating, <1-1/2" open 63.7' - Fracture, <10 deg, rough, undulating, <1" open			
65 -23.4			2	64.0, 64.5' - Mechanical break (2) 64.7' - Fracture, <10 deg, rough, undulating, tight			
66.5	R3-NQ 5 ft 98%	98	0	65.35' - Fracture, <10 deg, smooth, undulating, tight		R3: 12 minutes	
			0	67.8, 68.9, 70.8, 71.25' - Mechanical break (4)			
			0				
70 -28.4			0				
			0				
71.5	R4-NQ 5 ft 95%	84	NR			R4: 15 minutes	
			0				
			0	72.85' - Fracture, 65 deg, rough, undulating, tight			
75 -33.4			1	74.0' - Mechanical break 74.35' - Fracture, 15 deg, smooth, undulating, tight			
			0				
76.5							



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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
80 -38.4	R5-NQ 5 ft 100%	60	NR 0			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 HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 50% of rock surface, trace black organics 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 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 HCl 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 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'	R5: 11 minutes
85 -43.4	R6-NQ 5 ft 88%	74	1 0 2 0 NR				R6: 24 minutes
90 -48.4	R7-NQ 5 ft 75%	56	>10 0 >10 2 NR				SC-2 collected at 87.05-87.8'
95 -53.4	R8-NQ 5 ft 98%	95	1 0 1 0 0				R7: 15 minutes
96.5							R8: 11 minutes Stop coring on 03/23/2007



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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100 -58.4	R9-NQ 5 ft 100%	100	NR 0 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' 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 HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 70% from 91.5-92.3' 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 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 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 HCl reaction, trace organic lenses <1-1/2" x 1/4", few 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 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' 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	Resume coring at 08:00 on 03/24/2007 Water level at 1' below ground surface R9: 6 minutes	
105 -63.4	R10-NQ 5 ft 98%	98	NR 0 0 0	104.0, 106.35' - Mechanical break (2)		R10: 11 minutes	
110 -68.4	R11-NQ 5 ft 99%	42	NR 1 4 5 4 5	106.6' - Fracture (2), vertical and horizontal, rough, undulating, <1/2" open 107.7, 108.0, 108.25' - Fractures (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 80-90 deg, rough, undulating, intersecting fractures, tight	Driller's Remark: 30-40% loss of circulation at 108.5' R11: 5 minutes		
115 -73.4	R12-NQ 5 ft 100%	68	NR 1 >10 7 1 1	111.1, 111.2-111.9' - Fracture zone (2), horizontal and 75-90 deg, rough, undulating, tight 112.45, 112.65, 112.7, 113.0' 113.1, 113.25' 113.6, 113.7, 113.85, 115.3' 115.65' - Bedding plane (17), <10 deg, rough, undulating, tight to 1/4" open 112.6, 112.7, 113.2, 113.3' - Fractures (4), 60-70 deg, rough, undulating, intersecting fractures, tight	SC-3 collected at 114.4-115.3' R12: 5 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 7 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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
120 -78.4	R13-NQ 5 ft 94%	82	1	116.6' - Fracture, 60 deg, rough, undulating, tight	[Symbolic Log]	Limestone 116.5-121.2' - yellowish gray, (5Y 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 fossiliferous increasing with depth, fossil molds/casts <1/2" in diameter, several cavities (<1-1/2" x 1/2"), trace secondary infilling and organics	R13: 5 minutes	
			1	118.05' - Bedding plane, horizontal, rough, undulating, <1/4" open				
			0	120.0' - Fracture, 75 deg, rough, undulating, <1/4" open				
			2	120.0' - Fracture, 75 deg, rough, undulating, <1/4" open				
			>10	121.0-121.3' - Fracture zone, rough, undulating, <1-1/2" angular gravel sized rock fragments				
			NR	121.0-121.3' - Fracture zone, rough, undulating, <1-1/2" angular gravel sized rock fragments				
125 -83.4	R14-NQ 5 ft 96%	82	1	121.8' - Fracture, horizontal, rough, undulating, <1/2" open	[Symbolic Log]	No Recovery 121.2-121.5' 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 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 casts/molds <1' x 1/2" 125.0-126.3' - Same as 121.5-123.0'	Possible loss of circulation, 100% loss of circulation as R14 proceeded R14: 10 minutes	
			10	122.55, 122.65, 122.8, 122.9, 123.05' - Bedding plane (5), <10 deg, smooth, undulating, tight to 1/4" open				
			0	122.65, 122.95' - Fractures (2), 80 deg and vertical, rough, undulating, tight				
			0	123.85, 124.5, 124.7' - Mechanical break (3)				
			1	125.65' - Bedding plane, horizontal, smooth, undulating, tight				
			NR	125.65' - Bedding plane, horizontal, smooth, undulating, tight				
130 -88.4	R15-NQ 5 ft 100%	100	1	127.0' - Fracture, 60 deg, rough, undulating, tight	[Symbolic Log]	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 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 <1/2" x 1/4", trace secondary infilling, trace cavities <3/4" x 1/2"	SC-4 collected at 130.4-131.5' R15: 8 minutes	
			0	127.7' - Bedding plane, 15 deg, smooth, undulating, tight, possible mechanical break				
			0	130.35' - Fracture, horizontal, rough, undulating, <1/4" open				
			1	130.35' - Fracture, horizontal, rough, undulating, <1/4" open				
			0	130.35' - Fracture, horizontal, rough, undulating, <1/4" open				
			0	130.35' - Fracture, horizontal, rough, undulating, <1/4" open				
135 -93.4	R16-NQ 5 ft 100%	94	1	131.6' - Bedding plane, rough, undulating, <1/2" open, possible mechanical break	[Symbolic Log]	131.5-136.5' - yellowish gray, (5Y 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 (<3/16"), moderate to highly fossiliferous zones, fossil molds <1/2" x 1/4", trace secondary infilling of cavities	R16: 22 minutes	
			0	131.6' - Bedding plane, rough, undulating, <1/2" open, possible mechanical break				
			0	133.6, 134.0, 136.45' - Mechanical break (3)				
			1	135.15' - Fracture, 45 deg, rough, undulating, tight				
			2	135.15' - Fracture, 45 deg, rough, undulating, tight				
			2	135.15' - Fracture, 45 deg, rough, undulating, tight				



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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
140 -98.4	R17-NQ 5 ft 100%	90	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 10YR 5/4), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), laminated bedding from 137.5-138.05' and 140.2-140.65', voids (<3/16") over 0-30% of rock surface from 136.5-137.5', 138.05-140.2', and 140.65-141.5'	R17: 9 minutes	
			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				
			0	139.0, 140.55, 141.45' - Mechanical break (3)				
			0					
			0					
145 -103.4	R18-NQ 5 ft 86%	54	3	141.65' - Fracture, 40 deg, rough, undulating, tight		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 HCl reaction, medium strong (R3), minor infilling with medium grained and weak to medium strong (R2 to R3) limestone, trace voids (<3/16") 142.0-145.2' - Same as 141.5-142.0' except voids (<3/16") over 10-30% of rock surface, many cavities (<2" x 1") up to 40% secondary infilling with medium grained limestone, highly fossiliferous with molds and casts <1/2", possibly bioturbated 145.2-145.8' - Same as 141.5-142.0' except laminated bedding, trace voids, poorly fossiliferous No Recovery 145.8-146.5' Limestone 146.5-151.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), trace laminated bedding, trace organics, voids (<3/16") over 10% of rock surface, moderately fossiliferous with molds/casts <1" x 1/2", cavities <1/2" diameter from 146.5-146.6' 151.5-151.9' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), fine to medium grained, mild HCl reaction, weak (R2), trace secondary infilling 151.9-154.1' - Same as 151.5-151.9' except very fine to fine grained, medium strong (R3), voids (<3/16") over 20% of rock surface, moderately to poorly fossiliferous,	R18: 19 minutes	
			1	141.8' - Fracture, 50 deg, rough, undulating, tight				
			3	142.0' - Fracture, <10 deg, rough, undulating, <1/2" open				
			0	142.6' - Mechanical break				
			10	143.3' - Fracture, <10 deg, rough, undulating, <1/4" open				
			0	143.6' - Fracture, 40 deg, rough, undulating, tight				
150 -108.4	R19-NQ 5 ft 100%	92	NR	144.1' - Fracture, <10 deg, rough, undulating, tight		R19: 6 minutes		
			0	144.2-144.25, 144.85-144.9' - Fracture zone (2), <10 deg, rough, undulating, <1" open, subangular to angular rock fragments <1" in diameter				
			1	145.2' - Fracture, 15 deg, rough, undulating, tight				
			0	145.4' - Bedding plane, horizontal, smooth, undulating, tight				
			0	147.85, 149.0' - Mechanical break (2)				
155 -113.4	R20-NQ 5 ft 97%	83	1	148.05' - Bedding plane, horizontal, smooth, undulating, <1/4" open		SC-5 collected at 152.4-153.25'		
			0	151.15' - Fracture, 60 deg, rough, undulating, possible mechanical break, 1/4" open				
			1	151.9' - Bedding plane, horizontal, smooth, undulating, <1/4" open				
			0	152.0, 152.2, 152.4, 155.95' - Mechanical break (4)				
			1	154.0' - Fracture, 70 deg, rough, undulating, tight				
156.5			6	154.65, 154.7, 154.8, 154.95, 155.05, 155.3' - Bedding plane (6), <10 deg, smooth to rough, undulating, tight to <1/4" open		R20: 10 minutes		
			0					



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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
160 -118.4	R21-NQ 5 ft 100%	94	NR	1	156.85, 158.0, 160.8, 161.1' - Bedding plane (4), horizontal, rough, undulating, <1/4" open	Limestone 154.1-154.8' - Same as 151.5-151.9' except laminated bedding, voids (<3/16") over 30-50% of rock surface, poorly to moderately fossiliferous Limestone 154.8-155.3' - Same as 151.5-151.9' except weak to very weak (R2 to R1), laminated bedding, 155.3-156.35' - Same as 151.9-154.1' No Recovery 156.35-156.5' Limestone 156.5-161.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, strong HCl reaction, voids (<3/16") over 40-60% of rock surface, trace organics, moderately to highly fossiliferous, laminated bedding, secondary infilling of cavities over <10% of rock surface, open cavities (<1/2") over 10% or rock surface 161.5-166.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 20% of rock surface except from 161.5-162.4' where voids cover 20-50% of rock surface, poorly to moderately fossiliferous with fossil casts <1/4" in diameter, trace laminated bedding 166.5-170.4' - yellowish-gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, very weak to medium strong (R1 to R3), strength increases with depth, trace laminated bedding from 166.5-168.4', voids (<3/16") trace to 30-40% of rock surface from 168.4-170.4', moderately fossiliferous with molds <3/4" x 1/4" No Recovery 170.4-171.5' Limestone 171.5-176.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak to medium strong (R1 to R3), medium strong (R3) rock at 171.5-172.1', 172.2-174.5', and 174.95-176.4'; voids (<3/16") over 30-40% of rock surface, poorly fossiliferous with molds <1/2" x 1/4", trace laminated bedding	R21: 8 minutes Water level is <1.5' below ground surface at 17:45 Original boring A-2 completed to 161.5' and abandoned on 03/24/2007; replacement boring offset 7' NE from original and drilled to 161.5' with 3-7/8" tri-cone roller bit on NWJ rods, samples not collected NW casing installed in replacement boring to 161.5 on 03/29/2007, coring begins at 161.5' on 04/03/2007 at 11:30 Water level is <1.5' below ground surface at 09:00 on 04/03/2007 R22: 5 minutes R23: 12 minutes SC-6 collected at 175.35-176.4' R24: 7 minutes	
			1	0	158.7, 158.55, 158.95, 159.15, 159.7' - Mechanical break (5)			
			0	0				
			2	2	161.6, 162.4, 163.35, 164.7, 164.85, 165.05, 165.7, 165.8, 165.85, 165.9, 166.0, 166.05, 166.1, 166.25, 166.3, 166.45' - Bedding plane (16), <10 deg, smooth, undulating, to rough and planar, tight to <1/4" open			
			165 -123.4	R22-NQ 5 ft 100%	75			0	164.0, 164.15' - Mechanical break (2)
170 -128.4	R23-NQ 5 ft 78%	58	3	>10	166.5-166.7' - Bedding plane (5), horizontal, smooth, undulating to planar, tight			
			5	>10	167.65, 167.75, 167.8, 167.9, 167.95, 168.0, 168.1, 168.15, 168.2, 168.25' - Bedding plane (10), horizontal, smooth, undulating, to planar, tight			
			0	1	168.25-168.35' - Fracture zone or bedding plane, smooth, undulating, to rough and planar, tight to <1/4" open, multiple bedding plane fractures with vertical intersecting fractures			
			NR	1	169.0, 169.45' - Mechanical break (2) 169.55' - Fracture, <10 deg, rough, undulating, silt and/or clay sized infilling, <1/4" open, trace organic stain			
			175 -133.4	R24-NQ 5 ft 98%	64	4	171.55, 172.1, 172.2, 172.4, 173.2, 173.65, 173.85, 174.35' - Bedding plane (8), <10 deg, smooth, undulating, to rough and planar, tight to <1/4" open	
175 -133.4	R24-NQ 5 ft 98%	64	1	4	172.85, 175.35' - Mechanical break (2)			
			4	10	174.1' - Fracture, 70 deg, rough, undulating, tight			
			0	0	174.55-174.65' - Fracture zone, rough, undulating, gravel sized fragments 174.7, 174.9' - Bedding plane (2), <10 deg, smooth, undulating to planar, tight to <1/4" open			



PROJECT NUMBER: 338884.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 bgs on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
180 -138.4	R25-NQ 5 ft 86%	16	NR	3	176.6, 179.2' - Mechanical break (2)		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 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") 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 HCl reaction, medium strong (R3), interbedded and laminated fine and very fine grained limestone, undulating bedding planes, voids (<1/16") over <20% of rock surface, poorly fossiliferous with fossil molds <1/2" in diameter, several cavities 1-1/2" x 1/2" 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'	R25: 19 minutes
			5	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				
			3	178.45-178.44, 180.4-180.45, 180.5-180.6' - Fracture zone (3), smooth to rough, undulating, tight to 1/2" open				
			>10	181.5-181.65' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter				
			10	181.7' - Fracture zone, 20 deg, rough, undulating, <1/4" open				
			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				
			>10	184.15' - Fractures, horizontal and vertical, rough, undulating, multiple intersecting fractures				
			1	185.6' - Fracture, <10 deg, rough, undulating, <1/2" open				
			0	186.6' - Fracture or mechanical break, rough, undulating, <1/2" open				
			NR	187.4, 187.65, 187.95, 188.1, 188.3' - Bedding plane (5), <10 deg, smooth, undulating to planar, tight to 1/4" open				
185 -143.4	R26-NQ 5 ft 90%	48	2	189.65, 189.85, 190.5, 190.9, 191.05' - Fractures or mechanical break (5), rough, undulating, <1/2" open		R26: 15 minutes		
			4	190.5, 190.6, 191.05, 191.3' - Fracture zone (4), rough, undulating, rock fragments up to 1" diameter and sand sized grains				
			0	191.65' - Fracture or mechanical break, <10 deg, rough, undulating, <1/4" open				
			4	192.45' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open				
			>10	192.65' - Fracture or mechanical break, <10 deg, rough, undulating, tight				
			NR	192.9-193.1' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter				
			2	193.35, 193.45, 193.65, 193.8, 194.2, 194.6' - Bedding plane or mechanical break (6), <10 deg, rough, undulating, tight to <1/4" open				
			>10	195.05' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			2	195.05' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			>10					
190 -148.4	R27-NQ 5 ft 96%	56	2	195.05' - Fracture or mechanical break, horizontal, rough, undulating, tight		R27: 10 minutes		
			4					
			0					
			4					
			>10					
			NR					
			2					
			>10					
			2					
			>10					
195 -153.4	R28-NQ 5 ft 96%	56	2			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		
			>10					
			3					
			2					
			>10					
			NR					
			2					
			>10					
			2					
			>10					
196.5			NR					
			3					
			5					
			3					
			>10					
			10					
			NR					
			>10					
			1					
			0					



PROJECT NUMBER: 338884.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 bgs on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
200 -158.4	R29-NQ 5 ft 68%	20	NR	>10	195.65' - Fracture or mechanical break, 50 deg, rough, undulating, 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 HCl 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	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
			2	>10	196.0-196.3' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2" diameter		
			2	>10	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		
			NR	>10	197.9' - Fracture or mechanical break, 30 deg, rough, undulating, <1/4" open		
			NR	>10	198.4' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open		
			NR	>10	198.6, 198.8' - Mechanical break (2)		
			NR	>10	199.25, 199.4, 199.55' - Bedding plane (3), <10 deg, smooth, planar, tight		
			NR	>10	199.7' - Bedding plane, horizontal, smooth, undulating, silt and/or clay sized infilling, organic stained, poorly indurated organic silt lens, <1/4" open		
			NR	>10	201.8' - Fracture or mechanical break, 60 deg, rough, stepped to undulating, tight to <1/4" open		
			NR	>10	201.8' - Fracture or mechanical break, 60 deg, rough, stepped to undulating, tight to <1/4" open		
205 -163.4	R30-NQ 5 ft 74%	10	>10	>10	201.9' - Bedding plane, <10 deg, rough, undulating, <1" open	No Recovery 196.3-196.5' Limestone 196.5-199.0' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate HCl 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" diameter over 20-30% of rock surface	R30: 14 minutes
			>10	>10	202.05' - Fracture, vertical, rough, undulating		
			>10	>10	202.2-202.4, 202.55-202.8' - Fracture zone (2), rough, undulating, gravel sized fragments <1-1/2" diameter		
			NR	>10	202.9, 203.0, 203.15, 203.35, 203.5, 203.7' - Bedding plane (6), <10 deg, smooth, undulating, tight to <1/4" open		
			>10	>10	203.7-203.9, 204.35-204.7' - Fracture zone (2), rough, undulating, gravel sized fragments <2" diameter		
			>10	>10	205.0' - Fracture, 40 deg, rough, undulating, <1" open		
			>10	>10	206.8' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open		
			>10	>10	206.95' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open		
			>10	>10	207.35-207.55' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter		
			>10	>10	207.95, 208.85' - Mechanical break (2)		
210 -168.4	R31-NQ 5 ft 64%	40	>10	>10	208.3, 208.4' - Bedding plane (2), <10 deg, rough, undulating, <1/4" open	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 HCl reaction, weak to medium strong (R2 to R3), interbedded with extremely weak to very weak (R0 to R1) limestone, 20% laminated, trace organic 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	R31: 7 minutes
			>10	>10	209.1' - Fracture or mechanical break, rough, undulating, <1/2" open		
			>10	>10	210.0' - Fracture or mechanical break, 35 deg, rough, undulating, <1" open		
			>10	>10	211.5-212.7' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter		
			>10	>10	212.7' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	213.1' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open		
			>10	>10	213.1-213.2' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter		
			>10	>10	212.7' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	213.1' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open		
			>10	>10	213.1-213.2' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter		
215 -173.4	R32-NQ 5 ft 34%	7	>10	>10	215.2-215.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter	No Recovery 205.2-206.5' Limestone 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"	R32: 11 minutes
			>10	>10	215.5-216.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		
			>10	>10	216.5' - Fracture or mechanical break, <10 deg, rough, undulating		



PROJECT NUMBER: 338884.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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -178.4	R33-NQ 5 ft 38%	0	>10 >10 NR		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 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 HCl reaction, poorly consolidated silts to very weak (R1) rock, laminated bedding, trace voids in few bedding planes, fossils absent 208.3-209.7' - Same as 206.5-207.0' No Recovery 209.7-211.5' Limestone 211.5-213.2' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCl 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 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 fossiliferous with molds/casts <1/2" diameter, trace organic laminations No Recovery 218.4-221.5' 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, 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 7/2), very fine to fine grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 10-30% of rock surface, poorly to moderately fossiliferous, few cavities <1/4" diameter, trace organics, medium strong (R3) rock from 227.4-227.5' No Recovery 228.3-231.5'	Formation collapsing on core barrel at 216.5', advance NW casing to 209' R33: 14 minutes Stop coring at 221.5 at 18:30 on 04/04/2007; water level at ground level Resume coring at 07:00 on 04/05/2007 Recovery loss for R34 due to core barrel blockage at 221.7' R34: 19 minutes R35: 12 minutes SC-7 collected at 231.5-232.5' R36: 18 minutes	
225 -183.4	R34-NQ 5 ft 4%	0	>10 NR		221.5-221.7' - Fracture zone or mechanical break, rough, undulating, angular gravel sized fragments <1-1/2" diameter 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 227.5-228.1' - Fracture zone, rough, undulating, angular gravel sized fragments <1" diameter		
230 -188.4	R35-NQ 5 ft 36%	0	>10 >10 NR		232.5' - Bedding plane, horizontal, smooth, undulating, <1/8" open 232.6' - Fracture, 60 deg, rough, undulating, tight 232.8-233.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter		
235 -193.4	R36-NQ 5 ft 40%	20	0 >10 NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-02	SHEET 13 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 on 03/22/07 START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
240 -198.4	R37-NQ 5 ft 58%	30	>10 2 10 NR	<p>236.6' - Fracture or mechanical break, <10 deg, rough, undulating, <1/4" open</p> <p>236.9-237.15' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter</p> <p>237.25, 237.45, 238.0, 238.15, 238.85' - Fracture or mechanical break (5), <10 deg, rough, undulating, tight to <1/4" open</p> <p>239.2-239.25' - Fracture zone or bedding plane, rough, undulating, <1/2" open, bedding plane fractures with vertical fractures</p>	<p>Limestone 231.5-233.5' - yellowish gray, (5Y 8/1), very fine to fine grained, mild to moderate HCl reaction, very weak (R1), voids (<3/16") over 10-20% of rock surface, poorly to moderately fossiliferous with fossil molds/casts <1/4", medium strong (R3) rock from 233.15-233.25'</p> <p>No Recovery 233.5-236.5'</p> <p>Limestone 236.5-239.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 20-50% of rock surface, trace laminated bedding, poorly to moderately fossiliferous with fossil molds/casts <3/4", few cavities <1/2" in diameter, secondary infilling of cavities at 238.5-239.2'</p> <p>No Recovery 239.4-241.5'</p> <p>Limestone 241.5-242.55' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), strength decreases with depth, voids (<3/16") over 20-40% of rock surface, moderately fossiliferous with molds/casts <3/4" in diameter, trace laminations</p> <p>Sandy Silt (ML) 242.55-243.3' - very fine to medium grained, moderate HCl reaction, carbonate derived silts and sands</p> <p>No Recovery 243.3-246.5'</p> <p>Limestone 246.5-247.35' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), laminated with organics, trace voids (<3/16"), few cavities <1/4" in diameter, poorly fossiliferous</p> <p>No Recovery 247.35-251.5'</p> <p>Bottom of Boring at 251.5 ft bgs on 4/5/2007</p>	<p>R37: 13 minutes</p> <p>R38: 17 minutes</p> <p>R39: 17 minutes</p> <p>Boring completed to 251.5' at 15:30 on 04/05/2007</p>	
245 -203.4	R38-NQ 5 ft 36%	0	>10 0 NR	<p>241.65' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open</p> <p>241.65-241.8' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter</p> <p>241.85' - Mechanical break</p> <p>241.11, 242.35' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, <1/4" open</p> <p>242.4, 242.55' - Mechanical break (2)</p>			
250 -208.4	R39-NQ 5 ft 17%	0	>10 NR	<p>246.65-246.95' - Fracture zone, rough, undulating, gravel sized fragments <3/4" diameter</p> <p>247.25' - Bedding plane or mechanical break, smooth, undulating, <1/4" open</p>			
251.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-03	SHEET 1 OF 12
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.1						C. Wallestad and N. Jarzyniecki also logged portions of boring A-03
3.5						
5	1.2	SS-1	3-4-6 (10)	Poorly Graded Sand With Silt (SP-SM) 3.5-4.7' - very pale orange and dark yellowish orange, (10YR 8/2 and 10YR 6/6), wet, loose, very fine to fine grained, silica sand, 6% nonplastic fines, trace root matter, trace iron cemented sand nodules <1/4" diameter		Moderate to light chatter, slow advancement at 5.0-8.5'
37.1	5.0					
8.5						
10	0.9	SS-2	3-8-4 (12)	Silt (ML) 8.5-9.4' - pale yellowish orange, (10YR 8/6), wet, stiff, nonplastic to low plasticity, rapid dilatancy, mild to moderate HCl reaction, 5-10% fine to medium grained sand, all carbonate		Very slow drilling at 11.5-13.5'
10	10.0					
13.5	0.0	SS-3	50/1 (50/1")	No Recovery 13.5-13.6'		Rapid advancement
15						
27.1						
18.5						
18.8	0.3	SS-4	50/4 (50/4")	Silt With Sand (ML) 18.5-18.8' - pale yellowish orange, (10YR 8/6), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15-20% fine to medium grained sand, all carbonate		Very dense layer at 18.75', very slow advancement
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-03	SHEET 2 OF 12
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
22.1							Moderate to rapid advancement at 22.5'
23.5							Sample SS-5 may be weak limestone
25	1.5	SS-5	23-36-46 (82)	Silty Sand (SM) 23.5-25.0' - grayish orange, (10YR 7/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 46% nonplastic fines, approximately 5 interbedded extremely weak (R0) limestone lenses <1/2" thick			
17.1							
28.5							
30	1.5	SS-6	8-9-27 (36)	Silty Sand (SM) 28.5-30.0' - Same as 23.5-25.0' except dark yellowish orange, (10YR 6/6), dense, 1/2" lense of medium plastic silt at 28.6', approximately 5 interbedded limestone lenses up to 1/2" thick			Moderate drilling rate with variable thin, dense zones.
12.1							
33.5							
35	0.5	SS-7	4-10-50/1.5 (60/7.5")	Silty Sand With Limestone (SM) 33.5-34.0' - Same as 28.5-30.0' except 50% of sample is limestone lenses to 1/2" thick			
7.1							
38.5							
40	0.9	SS-8	22-50/5 (72/11")				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-03	SHEET 3 OF 12
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		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
				6"-6"-6" (N)			
2.1				Silty Sand With Limestone (SM) 38.5-39.4' - olive gray, (5Y 4/1), wet, very dense, fine to coarse grained, moderate HCl reaction, 30% nonplastic fines, with interbedded limestone lenses to 1" thick, all carbonate			Slow drilling with intermittent light chatter at 40.0-43.5'
43.5							
43.6	0.1	SS-9	50/1 (50/1")	Limestone Fragments 43.5-43.6' - olive gray, (5Y 4/1), mild to moderate HCl reaction, coarse sand to fine gravel-sized fragments (<1/2" in diameter), trace fossils and voids <1/16" Begin Rock Coring at 43.5 ft bgs See the next sheet for the rock core log			
45 -2.9							
50 -7.9							
55 -12.9							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-03	SHEET 4 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
43.5			0		Limestone 43.5-45.9' - moderate yellowish brown, (10YR 5/4), fine grained, weak to extremely weak (R2 to R0), voids (<1/6") over 60-70% of rock surface, hardness decreases with depth, highly to poorly fossiliferous decreasing with depth, trace laminations	HW casing installed to 43.5'; begin rock coring at 43.5'	
45 -2.9	R1-NQ 2.5 ft 90%	88	0			R1: 5 minutes	
46.0			NR				
46.0			3		45.4' - Bedding plane or fracture, <10 deg, rough, undulating, <1/4" open		
			1		46.15, 46.25, 46.4' - Bedding plane or mechanical break, 0-<10 deg, smooth, undulating, <1/4" open		
			1		46.55, 47.2, 47.85' - Mechanical break		
			0		47.4-47.65' - Clay seam		
	R2-NQ 5 ft 86%	77	0		48.5' - Mechanical break		
50 -7.9			1		49.25-49.45' - Clay seam		
			NR		50.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight	R2: 4 minutes	
51.0			0		No Recovery 50.3-51.0'		
			4		Limestone 51.0-55.9' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 80-90% of rock surface, moderately to highly fossiliferous with molds up to 1/2"x1/4", extremely weak at 52.0-52.5'		
	R3-NQ 5 ft 98%	84	2		52.3, 52.5' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/8" open		
			2		52.85' - Fracture or mechanical break, 50 deg, rough, undulating, tight		
			2		53.0' - Bedding plane or mechanical break, 35 deg, rough, undulating, tight		
55 -12.9			2		53.2' - Fracture or mechanical break, 20 deg, rough, undulating, tight	R3: 8 minutes	
			2		53.3' - Fracture or mechanical break, 50 deg, rough, undulating, tight		
			NR		53.45, 53.6' - Mechanical break		
			1		54.25' - Fracture or mechanical break, 60 deg, rough, undulating, tight		
			5		55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight		
			1		55.7' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" infilling, sand infilling, open		
	R4-NQ 5 ft 90%	67	1		56.55' - Fracture or mechanical break, 30 deg, rough, undulating, tight		
			2		57.25, 57.35, 57.5, 57.55, 58.0, 58.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open		
60 -17.9			2		59.25' - Bedding plane or mechanical break, <10 deg, smooth, undulating, <1/4" open	R4: 10 minutes	
			NR		59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open		
			1		60.2, 60.45' - Bedding plane or mechanical break, <10 deg, rough to smooth, undulating, 1/4" open		
			1		61.8' - Fracture or mechanical break, 30 deg, rough, undulating, sandy or fragmented infilling, 1/2" to 1/4" open		
	R5-NQ						



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
65 -22.9	5 ft 84%	74	1	62.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/2" to 1/4" open	Limestone 61.0-65.2' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCl 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 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 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, (10YR 6/2), mild to moderate HCl 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 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 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' Limestone 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 HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 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 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' 78.1-78.45' - Same as 76.0-76.9' No Recovery 78.45-81.0'	R5: 12 minutes	
			1	63.45' - Mechanical break			
			1	63.7-64.0' - Fracture or mechanical break, <10 deg, rough, undulating, rock fragment infilling, 3-1/2" open			
			NR	64.65' - Bedding plane or mechanical break, horizontal, smooth, undulating, 1/8" open			
			2	65.05' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" open			
			0	66.3' - Fracture or mechanical break, 60 deg, rough, undulating, tight			
	R6-NQ 5 ft 100%	98	1	66.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
			0	68.45' - Bedding plane, horizontal, smooth, undulating, tight			
			1	70.0' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight			
			1	70.2, 71.0' - Mechanical break			
70 -27.9			1	71.55' - Fracture, 25 deg, rough, stepped, 1/4" open			
			3	72.4' - Fracture, 60 deg, smooth, undulating, tight			
	R7-NQ 5 ft 74%	53	NR	72.65' - Fracture or mechanical break, 20 deg, rough, undulating, tight			
			0	72.8' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight			
			1	72.9-73.9' - Clay seam, driller reports soil horizon			
			4	74.5' - Fracture, 40 deg, rough, undulating, tight			
			NR	75.15, 75.25' - Bedding plane, horizontal, smooth, undulating, tight			
			1	75.5, 75.55' - Bedding plane or mechanical break, horizontal, smooth to rough, undulating, tight			
			0	76.9' - Bedding plane or mechanical break, <10 deg, rough, undulating, open 1"			
	R8-NQ 5 ft 49%	27	0	77.1' - Fracture, 70 deg, rough, undulating, 1/2" open			
			NR	77.3-77.5' - Clay seam			
			NR	77.75, 77.85, 77.9, 78.05' - Bedding plane, horizontal, smooth, undulating, tight			
80 -37.9			2	81.35, 81.4' - Fracture or mechanical break, <10 deg, smooth to rough, undulating, organic staining over 50-80% of surface, <1/2" open			
			1	82.7, 83.25, 83.4' - Mechanical break			
	R9-NQ						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -42.9	5 ft 98%	84	2	83.6, 83.7' - Bedding plane, rough, undulating	Limestone 81.0-85.35' - yellowish gray to very light gray, (5Y 7/2 to N8), very fine to fine grained, weak to medium strong (R2 to R3), extremely weak at 83.6-83.7', laminated from 81.0-81.4', voids (<1/16") over 30% of rock surface, organics rare from 81.35-81.4', secondary infilling of very fine grained matrix from 81.4-83.6', fossiliferous with molds up to 1/2"x1/4" with some secondary infilling, cavities up to 3" with secondary infilling, voids (3/16") over 80-90%, organics, fossiliferous, and cavities up to 1-1/2", possible bioturbation at 81.4-83.6' 85.35-85.9' - Same as 81.0-85.35' except extremely weak to very weak (R0 to R1), molds up to 1"x1/4" with some secondary infilling, cavities up to 1-1/2"x1/2", trace organics No Recovery 85.9-86.0' Limestone 86.0-87.0' - Same as 85.35-85.9' except fat clay (CH) to elastic silt (MH) seams at 86.8' and 87.5', secondary infilling of cavities at 86.65-86.8', cavities up to 1-1/2"x1/2" 87.0-87.65' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak (R0), fossil molds up to 1/2"x1/4", cavities few, some secondary infilling 87.65-90.3' - light olive gray to dark yellowish brown, (5Y 5/2 to 10YR 4/2), very fine to fine grained, very weak to medium strong (R1 to R3), voids (<3/16") over 60% of rock surface, cavities few (up to 1/2"), trace organics, possible bioturbation, very fossiliferous, molds and casts up to 1/4"x1/2" No Recovery 90.3-91.0' Limestone 91.0-93.0' - dusky yellow, (5Y 6/4), very fine to fine grained, very weak to medium strong (R1 to R3), fossiliferous with casts up to 3/4"x1/2", voids (3/16") over 30% of rock surface, cavities up to 1/2"x1/4" over 15% of rock surface, yellowish gray (5Y 7/2) secondary infilling up to 2"x2" with trace voids (1/16"), trace organics	R9: 12 minutes	
			0				
			>10	85.55-85.9' - Fracture zone, rough, undulating to stepped			
			NR	86.0-86.3' - Fracture zone, rough, undulating to stepped, intersecting fractures			
			>10	86.8-87.0' - Bedding plane, <10 deg, 1/2" clay infilling, 1/2" open			
			1	87.6' - Bedding plane, <10 deg, smooth, undulating, 1/4" open			
	R10-NQ 5 ft 86%	64	0	88.5' - Mechanical break			R10: 7 minutes
			>10				
			>10	89.7-90.3' - Fracture zone, rough, undulating, intersecting fractures			
			NR				
			0	92.0, 94.3' - Mechanical break			
			1				
	R11-NQ 5 ft 100%	76	0	92.8' - Bedding plane or mechanical break, <10 deg, smooth, undulating			
			4	94.05, 94.5' - Bedding plane or mechanical break, <10 deg, rough, undulating			
			>10	94.65' - Fracture, smooth, undulating, 1/4" open		R11: 24 minutes	
			0	94.75' - Fracture, 50 deg, infilling, up to 1/2" open			
			0	95.1-96.0' - Fracture zone, intersecting fractures		SC-2 collected at 96.0-97.0'	
			0	97.05, 99.5, 96.0-96.2' - Mechanical break			
	R12-NQ 5 ft 100%	87	1	98.7' - Mechanical break, 50 deg, rough, stepped			
			1				
			5	99.9' - Bedding plane, <10 deg, smooth, undulating, up to 1/4" open		R12: 10 minutes	
			1	100.35, 100.4' - Fracture, <10 deg, rough, undulating, up to 1/4" open			
			1	100.55-101.0' - Fracture zone, 80-85 deg, rough, undulating, fracture interval separated by bedding plane fractures			
			1	100.7-100.9' - Fracture zone or bedding plane, rough, undulating			
	R13-NQ			101.2, 103.3, 103.5, 103.6, 104.4' - Mechanical break			



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
105 -62.9	5 ft 100%	98	0	101.3' - Fracture, 50 deg, rough, undulating 102.5' - Mechanical break, <5 deg, rough, undulating		93.0-96.0' - yellowish gray, (5Y 7/2), weak to medium strong (R2 to R3), voids over <10% of rock surface increasing to 30% from 93.65-94.35', fossiliferous with molds/casts up to 1/2"x1/4", possibly bioturbated from 93.65-94.35'	R13: 8 minutes	
			1	104.95' - Bedding plane, rough, undulating				
			0					
			0	106.5, 108.3, 109.2' - Mechanical break		Limestone 96.0-101.0' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to medium strong (R1 to R3), voids (3/16") over 35% of rock surface decreasing to 15-20% at 99.8', fossiliferous with casts/molds up to 1/2"x1/4", organics visible in solution cavities at 98.4-98.6', secondary infilling with voids over <10% of surface and with trace fossils		
	R14-NQ 5 ft 100%	87	1	107.35' - Bedding plane, <15 deg, rough, undulating, 1/4" open				
			3	108.1, 108.6, 108.8' - Bedding plane, 10 deg, smooth to rough, undulating, tight to up to 1/8" open at 108.8'				
			1					
110 -67.9			3	109.75' - Mechanical break, 10-15 deg, rough, undulating		101.0-106.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak to very weak (R2 to R1), voids over 20-30% of rock surface, fossiliferous with casts up to 1"x1/2", fossils and voids increase from zone at 102-103.5', clay infilling over 5% of voids, secondary infilling of yellowish gray (5Y 8/1) limestone with <10% voids and fossils; sparsely fossiliferous from 101-102.5' with 15-25% voids on rock surface	SC-3 collected at 109.75-110.65' R14: 5 minutes	
			3	110.65, 110.85, 110.95' - Bedding plane, <10 deg, rough, undulating, up to 1/4" open				
			0	111.05' - Fracture zone, rough, undulating, intersecting fractures				
			0	111.7, 112.1, 115.15-115.2, 115.85' - Mechanical break				
	R15-NQ 5 ft 100%	89	6	113.1, 113.35, 113.45, 113.55, 113.7, 113.8, 114.1, 144.3, 144.35, 114.75, 114.85' - Fracture zone or bedding plane, <10 deg, smooth to rough, undulating, up to 1/8" open, healed fracture at 119.6'		106.0-106.9' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, very weak (R1), voids (1/16") over 20% of rock surface, fossiliferous with molds/casts up to 1"x1/2", laminar bedding planes	R15: 9 minutes	
115 -72.9			5					
			1	115.5' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1/8" open		106.9-111.0' - yellowish gray, (5Y 5/2), very fine to fine grained, very weak to weak (R1 to R2), voids (3/16") over 25-30% of rock surface, fossiliferous with fossils up to 1/4"x1/4", possible dissolution cavities up to 1/2"x1/2"		
			3	116.1, 116.45, 116.55' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1/4" open		111.0-119.0' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak (R1), voids (<1/16") over 10-30% of rock surface, voids with secondary infilling over additional 25% of rock surface, secondary infilling is yellowish gray (5Y 8/1)		
			0			119.0-121.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak (R2), voids (3/16") over 30% of rock surface, highly fossiliferous, with fossils up to 1/2"x1/4", dissolution cavities up to 1/4" in diameter over 15% of rock surface		
	R16-NQ 5 ft 100%	88	0	118.5, 118.45, 116.75, 119.8, 120.9' - Mechanical break				
			1	119.3' - Bedding plane, rough, undulating, ground rock infilling, up to 1/2" open				
			2					
120 -77.9			1	120.6' - Bedding plane, rough, undulating			R16: 6 minutes	
			1	120.95' - Fracture or mechanical break, rough, undulating, high angle fracture				
			2	121.35' - Bedding plane, 15 deg, rough, undulating, 1/2" open				
			2	122.0' - Bedding plane, rough, undulating to stepped, tight				
	R17-NQ							



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -82.9	5 ft 100%	88	1	122.9' - Fracture, 55 deg, smooth to rough, 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	Limestone 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 and 125.2-126.0', fossiliferous with highly fossiliferous zones at 121.0-122.2', 123.8-124.2' and 125.2-126.0' (casts/molds), dissolution cavities at 121.8' and 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' except very weak to weak (R1 to R2), voids decreasing with depth 127.1-131.0' - yellowish gray, (5Y 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, fossiliferous with some fossils up to 1/4" in diameter, trace cavities 131.0-134.8' - yellowish gray to 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 10-30% of rock surface increasing with depth, fossiliferous as casts/molds, fossils more abundant at 132.7-133.2', laminar bedding planes 134.8-136.0' - yellowish gray, (5Y 7/6), very fine to fine grained, weak (R2), voids (3/16"), fossiliferous (casts), dissolution cavities at 134.9-135.2' (1"x1/2") 136.0-141.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), very fine to fine grained, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface increasing to 1/8" at 138.7' covering 25% of rock surface, dissolution cavities up to 1/4" with some secondary calcite mineralization, poorly fossiliferous, laminar bedding	R17: 11 minutes	
130 -87.9	126.0	98	0	125.75' - Fracture, 55 deg, rough, undulating		R18: 7 minutes SC-4 collected at 130.15-131.1'	
135 -92.9	R18-NQ 5 ft 100%	98	1	126.9-126.95' - Fracture zone, intersecting fractures, up to 1/4" open 127.4' - Bedding plane, rough, undulating, up to 1/4" open 127.5, 130.15, 130.9' - Mechanical break 128.4, 128.7' - Bedding plane, tight to 1/4" open		R19: 8 minutes	
140 -97.9	131.0	94	2	131.95, 133.3, 134.35, 135.5' - Mechanical break 132.4, 132.9' - Fracture, 40 deg, smooth to rough, undulating	R20: 8 minutes Driller's Remark: 100% loss of circulation fluids at 140' SC-5 collected at 141.85-142.9'		
	R19-NQ 5 ft 100%	94	4	133.45' - Bedding plane, <5 deg, smooth, undulating 133.55' - Fracture, 80 deg, rough to smooth, undulating, tight			
	136.0	69	0	135.5, 133.6' - Fracture, 75 deg and 80 deg, rough to smooth, undulating, fractures intersect at 133.55' 136.05' - Bedding plane, 40 deg, rough to smooth, undulating 136.35, 136.7, 136.85' - Bedding plane, 40 deg, rough to smooth, undulating, up to 1/4" open 136.45, 137.1, 137.75, 139.0' - Mechanical break 137.3-137.75' - Fracture zone or bedding plane, multiple high angle intersecting fractures 138.2, 138.5, 139.2' - Bedding plane, 40 deg, rough to smooth, undulating, up to 1/4" open 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, undulating, up to 1/2" open 141.3, 141.95, 145.9' - Mechanical break 141.45' - Bedding plane, <10 deg, smooth, undulating			
	R20-NQ 5 ft 100%	69	2				
	141.0		1				
	R21-NQ		0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.9	5 ft 91%	53	>10	143.0' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1" open 143.3' - Bedding plane, <10 deg, some recrystallization on 20% of surface 143.5-144.6; 145.05-145.55' - Fracture zone, intersecting fractures	Limestone 141.5-143.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, very weak to weak (R1 to R2), voids over 20% of rock surface, cavities over 10% of rock surface up to 1-1/3"x3/4", most voids and cavities infilled with medium gray (N6) material, fossiliferous (as casts) 143.1-145.55' - yellowish gray to very light gray, with light olive grey mottling, (5Y 7/2 to N8, with 5Y 5/2), very fine to fine grained, weak to medium strong (R2 to R3), voids over 15% of rock surface, dissolution cavities up to 1/2" in diameter, fossiliferous (as casts) No Recovery 145.55-146.0' Limestone 146.0-147.2' - Same as 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 pale orange, (5Y 6/4 to 10YR 8/2), very fine to fine grained, very weak (R1), voids (<3/16") over 30% of rock surface, dissolution cavities up to 1/4" in diameter, fossiliferous (fossils 1/16"-1" in length), some voids and cavities with dusky yellow (5Y 6/4) to light olive gray (5Y 6/1) secondary infilling No Recovery 150.0-151.0' Limestone 151.0-152.75' - dusky yellow to light gray, (5Y 6/4 to N7), very weak to weak (R1 to R2), voids (up to 1/16") 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" thick) 152.75-155.45' - yellowish gray, (5Y 7/2), very fine to fine grained, weak (R2), very weak at 154.45-155.4', voids (up to 3/16") over 20% of rock surface, poorly fossiliferous, laminar beds No Recovery 155.45-156.0' Limestone 156.0-156.45' - Same as 152.75-155.45' except very weak (R1), laminar organics (<3/4") thick, moderately fossiliferous with casts up to 1/4"x1"	R21: 22 minutes	
150 -107.9	R22-NQ 5 ft 80%	71	4	146.1-146.15' - Fracture zone, open 146.3' - Bedding plane, <10 deg, smooth to rough, undulating to planar, organic staining 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" open 148.4, 149.0' - Bedding plane, <10 deg, up to 1/2" open		R22: 25 minutes	
155 -112.9	R23-NQ 5 ft 89%	71	1	151.05' - Fracture, 20 deg, up to 1/2" open 151.65, 151.8, 151.9' - Bedding plane, <20 deg, up to 1/2" open 152.0' - Bedding plane, <5 deg, tight		R23: 12 minutes	
160 -117.9	R24-NQ 5 ft 92%	66	1	153.8' - Mechanical break, 50 deg 154.35-154.6' - Fracture zone or bedding plane, <10 deg, 1/2" open at 156.5 155.4-155.55' - Fracture zone, intersecting fractures 156.0-156.1' - Fracture zone, open 156.35, 156.45' - Bedding plane, <10 deg, rough, undulating, up to 1/8" open 156.4' - Fracture, 85 deg, 1/8" open	R24: 8 minutes		
	R25-NQ		2	157.6' - Bedding plane, <10 deg, rough, undulating, 1/4" open 158.5-158.8' - Fracture zone, 50 deg, rough, undulating, organic staining over 10-20% 159.0-159.45' - Fracture zone, rough, undulating, intersecting fractures, up to 1/4" open 159.55, 159.75' - Bedding plane, 10 deg, rough, undulating, 1/8" open 160.5' - Fracture, 50 deg, rough, undulating, 1/8" open 161.55' - Bedding plane, <5 deg, rough to 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, rough, undulating	End drilling for the day 03/11/2007, 18:30 at 161.0' Resume drilling on 03/12/2007, water level is 1.0' below ground surface		



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
165 -122.9	5 ft 86%	85	1			Limestone 156.45-160.6' - very fine to fine grained, very weak to weak (R1 to R2), alternating laminar beds up to 8" thick defined by changes in voids, voids ranging from <10% up to 30% (up to 1/16"), dissolution cavities at 157.6', 158.45', 158.9', and 159.5' up to 1/2"x1/4" over 15% of rock surface, poorly to moderately fossiliferous No Recovery 160.6-161.0' Limestone 161.0-165.3' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, voids (up to 3/16") over <10% of rock surface, fossil casts over <10% of rock surface, laminar bedding characterized by color change and % voids, trace organics, highly fossiliferous from 162.05-163' with increase in voids (up to 1/4") over 35% of rock surface, some secondary infilling of voids with yellowish gray (5Y 7/2) to gray (N7) limestone No Recovery 165.3-166.0' Limestone 166.0-168.7' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), very fine to fine grained, weak to medium strong (R2 to R3), extremely weak (R0) to very weak rock (R1) at discontinuities, voids (<3/16") over 60-80% of rock surface, several cavities (>5) from 1/4"-1/8" on bedding laminations, poorly fossiliferous 168.7-170.25' - Same as 166.0-168.7' except mild to moderate HCl reaction, moderately to highly fossiliferous (casts/molds), trace bedding plane laminations, trace secondary infilling of fossil molds at 169.8-169.9' No Recovery 170.25-171.0' Limestone 171.0-175.85' - light olive gray to pale yellowish brown, (5Y 5/2 to 10YR 6/2), very fine to fine grained, extremely weak to weak (R0 to R2), weakest along bedding plane fractures, voids (<3/16") over 50-80% of rock surface, laminated bedding at 171.8', 172.9' and 174.8-175.05', several cavities (<1/2") over 20% of rock surface, poorly fossiliferous No Recovery 175.85-176.0'	R25: 19 minutes	
			2					
			0	164.95' - Bedding plane, smooth to rough, undulating, up to 1/2" open				
			NR					
170 -127.9	R26-NQ 5 ft 85%	38	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, 168.15, 168.2, 168.35, 168.45, 168.50, 169.9, 170.0' - Bedding plane or mechanical break, <5 deg, smooth, undulating to planar, open up to 1/4"		SC-6 collected at 168.6-169.6' R26: 15 minutes		
			8					
			6					
			1					
			1					
			NR					
175 -132.9	R27-NQ 5 ft 97%	34	3	171.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		R27: 6 minutes		
			9	171.8' - Bedding plane, 20 deg, smooth, undulating, <1/8" open				
			3	171.95-172.25' - Fracture zone, <5 deg, rough to smooth, undulating, up to 1/4" open				
			4	172.4' - Fracture, 80 deg, rough to smooth, undulating, recrystallization on fracture surface				
			5	172.6' - Bedding plane, smooth to rough, undulating, silt-sized infilling, organic staining, up to 1/4" open				
			NR	172.9, 172.95, 173.1, 173.5, 174.0, 174.35, 174.65' - Bedding plane or mechanical break, <5 deg, smooth, undulating				
			1	174.5' - Bedding plane or mechanical break, 35 deg, smooth, undulating				
			5	175.0, 175.25-175.35, 175.55, 175.65, 175.75' - Bedding plane or mechanical break, rough, undulating, <1/2" open, friable from 175.25-175.35'				
			7	176.95' - Bedding plane or mechanical break, 20 deg, smooth to rough, undulating				
			>10	177.25, 177.3' - Bedding plane or mechanical break, 10 deg, smooth, undulating				
180 -137.9	R28-NQ 5 ft 91%	32	3	178.7, 178.8' - Bedding plane, <10 deg, rough, undulating, up to 1/4" open		R28: 19 minutes		
			NR	178.75' - Fracture, 60 deg and 65 deg				
			2	178.95' - Bedding plane, <10 deg, rough, undulating, up to 1" open				
			3	179.2-179.25' - Fracture zone, rough, undulating, 1/2" open				
			3	179.3' - Bedding plane, <5 deg, smooth to rough, planar				
	R29-NQ		3	179.45' - Bedding plane or mechanical break, smooth to rough, 1/2" to 1/4" open				



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
185 -142.9	5 ft 88%	54	>5	179.5, 179.65, 179.8, 179.85, 179.95, 180.0, 180.1, 180.15' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1/2" open	Limestone 176.0-178.5' - pale yellowish brown to very light gray, (10YR 6/2 to N8), very fine to fine grained, weak to medium strong (R2 to R3), voids (<3/16") over 60-80% of rock surface, dissolution cavity at 179.3' (1-1/2"x1"), few fossil molds	R29: 15 minutes	
			4	179.6-179.8' - Fracture zone, rough, undulating			
			0	181.3, 181.35' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" open			
			NR	181.45-181.6' - Fracture zone, 0-55 deg, rough, undulating, intersecting fractures	178.5-178.7' - Same as 176.0-178.5' except medium strong (R3), voids (<1/16") over 0-30% of rock surface, trace mottling	SC-7 collected at 186.0-186.75'	
186.0			1	182.75, 182.9, 183.0, 183.05, 183.35, 183.4, 183.45, 184.2, 184.3' - Bedding plane or mechanical break, smooth to rough, undulating, friable zones at 183.0-183.5'			
	R30-NQ 5 ft 100%	56	5	186.75, 187.05' - Bedding plane or mechanical break, <10 deg, rough, undulating, <1/4" open			
190 -147.9			5	187.2, 187.35, 187.75, 187.9, 188.1, 188.45, 188.65, 188.75' - Bedding plane, <10 deg, rough to smooth, undulating, with some <1/4" open	No Recovery 180.55-181.0' Limestone 181.0-185.4' - pale yellowish brown, (10YR 6/2), very fine to fine grained, very weak to medium strong (R1 to R3), with extremely weak (R0) and friable silty lens, voids (<3/16") over 60% of rock surface, few cavities (3/4"x1/4") poorly fossiliferous with few casts/molds, bioturbated, friable lens at 184.55-184.6'	R30: 18 minutes	
			3	189.25' - Fracture, 50 deg, smooth, undulating			
			4	189.65, 189.75, 190.4, 190.55, 190.75' - Bedding plane, <10 deg, rough to smooth, undulating, <1/8" open			
			3	191.1, 191.35, 191.7' - Fracture, <10 deg, rough, undulating	No Recovery 185.4-186.0' Limestone 186.0-191.0' - 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), voids (<3/16") over 70-80% of rock surface, moderately to highly fossiliferous especially at 186.0-186.75' (molds/casts), laminated bedding over 50% of rock surface	R31: 10 minutes	
			2	192.15' - Mechanical break			
	R31-NQ 5 ft 99%	62	3	192.85, 193.0-193.1' - Fracture zone, rough, undulating, <1/2" open			
195 -152.9			3	193.45, 193.6' - Mechanical break	191.0-193.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), fine grained, very weak to weak (R1 to R2), voids (<3/16") over 80% of rock surface, dissolution cavities (<1-1/2" diameter), laminated over 30% of rock surface, highly fossiliferous	R32: 11 minutes	
			3	193.75, 193.95, 194.1' - Bedding plane or mechanical break, <10 deg, rough, undulating to stepped			
			1	194.55' - Mechanical break, 40 deg			
			NR	194.75-194.9' - Fracture zone, rough, undulating	194.0-195.95' - Same as 191.0-193.0' except voids (<3/16") over 30-80% of rock surface, fossils decreasing with depth, highly fossiliferous with casts/molds and 2" diameter dissolution cavities at 195.6-195.8'	Total depth of boring is 201.0'	
			3	195.6-195.8' - Fracture, rough, undulating, 2" fragment missing over 180 degrees of core section			
	R32-NQ 5 ft 84%	40	>10	196.45' - Bedding plane, horizontal, rough, undulating, silt and/or clay sized infilling, 1/2" open			
200 -157.9			3	196.9-197.45' - Fracture zone, rough, undulating	No Recovery 195.95-196.0'		
			>10	198.55' - Bedding plane, horizontal, rough, undulating, 1/4" silt infilling			
			>10	198.8, 198.85, 199.15' - Bedding plane, <10 deg, rough, undulating, <1/4" open			
			>10	199.4-199.65; 199.95-200.1' - Fracture zone, rough, undulating to stepped			
			NR	199.65-199.95' - Fracture zone, smooth to rough, undulating, high angle fracture planes intersecting bedding plane at 199.8', tight			



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					<p>Limestone 196.0-197.45' - pale yellowish brown to very pale orange, (10YR 6/2 to 10YR 8/2), very fine to fine grained, extremely weak to weak (R0 to R2), voids (<3/16") over 50% of rock surface, mottled, bioturbated over 30% of rock surface, elastic silt (MH) from 196.0-196.5' 197.45-199.4' - Same as 196.0-197.45' except very weak to medium strong (R1 to R3), voids (<3/16") over 70-80% of rock surface, cavities (<3/4"x1/2"), highly fossiliferous, trace laminated bedding 199.4-200.2' - Same as 196.0-197.45' except voids (<1/16") over 30-50% of rock surface, poorly fossiliferous, organics from 199.5-200.1' No Recovery 200.2-201.0' Bottom of Boring at 201.0 ft bgs on 3/12/2007</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-04	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
41.3	0.0	1.0	SS-1	1-1-2 (3)	Poorly Graded Sand (SP) 0.0-1.0' - pale yellowish brown, (10YR 6/2), moist, very loose, very fine to fine grained, subrounded silica sand, trace nonplastic fines, 1" loamy organic layer at surface, brownish black (5YR 2/1), with 20% root mass/organics	"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water table between 1.5' and 5' below ground surface, based on split spoon sample Rapid drilling rate	
	1.5						
5 36.3	5.0	1.3	SS-2	1-2-3 (5)	Silty Sand (SM) 5.0-5.7' - dusky yellow, (5Y 6/4), wet, loose, very fine grained, subrounded silica sand, 20-25% low plasticity fines Clay With Sand (CH) 5.7-6.3' - moderate olive brown, (5Y 4/4), moist, firm, high plasticity, no dilatancy, 20-25% very fine grained silica sand		
	6.5						
10 31.3	10.0	1.3	SS-3	16-4-8 (12)	Fat Clay (CH) 10.0-10.2' - light olive gray, (5Y 5/2), wet, soft, medium to high plasticity, slow to no dilatancy, no HCl reaction, trace very fine grained silica sand Silt (ML) 10.2-10.7' - grayish yellow, (5Y 8/4), moist to wet, stiff, rapid to no dilatancy, moderate HCl reaction, fine to medium sand-sized lenses <1/2" thick at 10.2' contact, all carbonate Silt (ML) 10.7-11.3' - Same as 10.2-10.7' except wet (saturated)	Light chatter at 11 feet Moderate to slow drilling rate 11-20'	
	11.5						
15 26.3	15.0	1.0	SS-4	11-6-10 (16)			Sandy Silt (ML) 15.0-16.0' - grayish yellow, (5Y 8/4), moist, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, scattered lenses <1/4" thick of fine to coarse sand
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-04	SHEET 2 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.3	20.0	1.0	SS-5	18-11-11 (22)	<p>Silt And Limestone Lenses (ML) 20.0-21.0' - grayish yellow to grayish orange, (5Y 8/4 to 10YR 7/4), moist to wet, very stiff, nonplastic, rapid dilatancy, moderate to strong HCl reaction, all carbonate, 50% silt and 50% limestone lenses <2" thick, voids and fossil structures intact</p>	
	21.5					
25	25.0	1.5	SS-6	8-10-16 (26)		Moderate to heavy chatter 25-37', moderate to slow drilling rate
16.3	26.5					
30	30.0	0.2	SS-7	50/3 (50/3")		
11.3	30.3					
35	35.0	0.9	SS-8	20-50/5 (70/11")	<p>Silt With Sand (ML) 35.0-35.9' - moderate yellowish brown to dusky yellowish brown, (10YR 5/4 to 10YR 2/2), wet, hard, low to medium plasticity, slow to rapid dilatancy, mild HCl reaction, 15% fine to coarse sand-sized carbonate particles</p>	<p>Moderate to heavy chatter from 37-39', extremely slow drilling (15 minutes / 2 feet)</p> <p>Heavy chatter from 39-40', slow drilling rate</p>
6.3	35.9					
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-04	SHEET 3 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
1.3	40.0	0.1	SS-9	50/2 (50/2")	Limestone Fragments 40.0-40.1' - pale yellowish brown, (10YR 6/2), very dense, mild to moderate HCl reaction, very fine to fine grained, <10% voids <1/16" diameter		Moderate to heavy chatter from 40-55', moderate to rapid drilling rate
45 -3.7	45.0 46.4	1.4	SS-10	27-42-50/4.5 (92/10.5")	Silty Sand (SM) 45.0-46.4' - moderate yellowish brown, (10YR 5/4), moist to wet, very dense, very fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines		
50 -8.7	50.0 50.2	0.2	SS-11	50/2 (50/2")	Limestone Fragments 50.0-50.2' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, wafer-shaped fragments <1/2" thick		
55 -13.7	55.0 55.3	0.1	SS-12	50/3 (50/3")	Limestone Fragments 55.0-55.1' - Same as 50.0-50.2' Begin Rock Coring at 55.0 ft bgs See the next sheet for the rock core log		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)
60							



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
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-13.7	55.0 R1-NQ 1.5 ft 60%	60	0	55.7' - Mechanical break		Limestone 55.0-55.9' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), strength decreasing with depth, voids <3/16" over 60% of surface, trace organic laminations No Recovery 55.9-56.5' Limestone 56.5-60.1' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, extremely weak (R0), to compacted non-indurated carbonate silts, <10% organics, voids <3/16" over 30% of surface, weakest material at 56.5-57.2' and 58.5-60.0' No Recovery 60.1-61.5' Limestone 61.5-66.25' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, mild to moderate HCl reaction, extremely weak to weak (R0 to R2), <10% laminated organics, voids <3/16" over 40-50% of surface, strongest rock zones 62.0-63.0' and 63.7-65.8', few cavities <1"x1/2" No Recovery 66.25-66.5' Limestone 66.5-71.25' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate HCl reaction, extremely weak to medium strong (R0 to R3), voids < 3/16" over 30-50% of surface, few fossil casts and molds <1/4" diameter, trace secondary infill of cavities 1/4" diameter No Recovery 71.25-71.5' Limestone 71.5-74.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate HCl reaction, very weak to medium strong (R1 to R3), voids <3/16" over <30% of surface, moderately fossiliferous, fossil molds and casts <1-1/2" x 1/2", few cavities <1"x1/2"	Continue drilling at A-04 at 07:30 on 03/26/07 Begin rock coring at 55' Water level at 1 inch below ground surface at 07:30 R1: 2 minutes	
56.5			NR				R2: 8 minutes	
60	R2-NQ 5 ft 72%	48	4	56.9, 57.0, 57.4, 57.95, 58.05, 58.9, 59.55, 60.0' - Fractures (8), <10 deg, rough, undulating, along bedding planes, open <1/2"				
-18.7			3	57.4' - Fracture, 60 deg, rough, undulating, open <1/2"				
			>10	58.5' - Fracture, 40 deg, rough, undulating, open <1/2"				
			2	59.15-59.55' - Fracture zone, rough, undulating, gravel-sized fragments <2" diameter				
			NR					R2: 8 minutes
			0					
			1	63.1' - Fracture or mechanical break, 35 deg, rough, undulating, tight				
	R3-NQ 5 ft 95%	82	0	63.3, 61.75, 64.1' - Mechanical break (3)				
65			3	64.55, 64.65' - Fractures or mechanical break (2), <10 deg, rough, undulating, open <1/2"				
-23.7			2	65.2' - Fracture or mechanical break, 35 deg, rough, undulating, open <1/2"				
			NR	65.85, 66.05' - Fractures or mechanical break (2), <10 deg, rough, undulating, along bedding planes, open <1/2"				
			1	66.9, 67.9' - Fractures or mechanical break (2), <10 deg, rough, undulating, open <1/2"				
			1					
	R4-NQ 5 ft 95%	78	4	68.75, 69.1' - Fractures (2), 70 to 90 deg, rough, undulating, tight				
70			0	69.3' - Fracture or mechanical break, <10 deg, rough, undulating, tight				
-28.7			0	69.4, 70.05, 71.0' - Mechanical break (3)				
			NR					R4: 8 minutes
			0					
			3	73.05, 73.15' - Fractures (2), horizontal, rough, undulating, open <1/2"				
	R5-NQ 5 ft 62%	53	4	73.1' - Fracture, vertical, rough, undulating, intersects with 73.05' and 73.15', open 1/2"				
75				74.25, 74.35' - Fractures (2), horizontal and 50 deg, rough, undulating, open <1/4"				



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
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-33.7			NR	74.5' - Fracture, horizontal, rough, undulating, along bedding plane, open <1/4"		No Recovery 74.6-76.5'	R5: 10 minutes
76.5			2	76.7, 76.75' - Fractures (2), 40 deg and horizontal, smooth, planar, tight		Limestone 76.5-77.3' - very pale orange to dark yellowish orange, (10YR 8/2 to 10YR 6/6), very fine to fine grained, strong HCl reaction, extremely weak to medium strong (R0 to R3), strength increasing abruptly 77.3' to 77.4', non-indurated silt to extremely weak rock (R0) 76.5-77.3', trace voids <3/16", no fossils, trace laminated bedding	SC-1 collected at 76.75-77.6'
	R6-NQ 5 ft 91%	76	3	77.65, 78.1, 78.2' - Fractures or mechanical break (3), <10 deg, smooth, undulating, along bedding planes, open <1/4" to tight			
80			2	78.7, 78.85' - Fractures (2), 80 deg and 50 deg, rough, undulating, open 1/4" to 1/2"		77.3-80.1' - Same as 76.0-77.3' except medium strong (R3), voids <3/16" over 30-50% of surface, trace fossil casts, trace secondary infill 80.1-81.05' - Same as 77.3-80.1' except secondary infill with voids <3/16" over 30-50% of surface, poorly fossiliferous, heavily bioturbated with 50% of bioturbation with secondary infilling, cavities up to 1/2"x5"	R6: 18 minutes
-38.7			0	80.5' - Fracture or mechanical break, <10 deg, rough, undulating, tight			
81.5			NR			No Recovery 81.05-81.5' Limestone 81.5-82.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak to medium strong (R0 to R3), voids <3/16" over 30-60% of surface, heavily fossiliferous, fossil molds/casts <1"x1/4", cavities <1/2"x1/4", few cavities with secondary infill	R7: 9 minutes
	R7-NQ 5 ft 100%	86	2	82.15, 82.45' - Mechanical break or fractures (2), <10 deg, rough, undulating, open <1/2"			
85			>10			82.0-82.25' - Same as 81.5-82.0' except very weak (R1), laminated/variegated bedding 30% of zone 82.25-84.8' - Same as 81.5-82.0' 84.8-85.25' - Same as 81.5-82.0' except non-indurated silts as secondary infill, very very weak (<R0) 85.25-85.4' - Same as 81.5-82.0' 85.4-86.0' - Same as 81.5-82.0' except extremely weak (R0), trace voids	R8: 11 minutes
-43.7			0	83.5-83.9' - Fracture zone, rough, undulating, gravel-sized fragments <1-1/2" diameter			
86.5			0			86.0-86.5' - Same as 81.5-82.0'	SC-2 collected at 95.65-96.45'
	R8-NQ 5 ft 98%	84	1	87.35' - Fracture or mechanical break, 60-90 deg, rough, undulating, tight to open 1/8"			
90			4	87.65' - Fracture or mechanical break, 20 deg, rough, undulating, tight to open 1/8"			
-48.7			0	88.25, 88.4, 88.45' - Mechanical break or fractures (3), rough, undulating, open <1/2" at 88.25', others are tight			
91.5			0	88.9, 88.95, 89.35' - Mechanical break (3)			
			NR				
			2	91.65' - Fracture, horizontal, smooth, planar, along bedding plane, tight			
			10	92.2' - Fracture, 70 deg, rough, undulating, tight			
			10	92.85-92.9' - Fracture zone, rough, planar			
95			50	93.6, 93.7, 93.8, 93.9, 94.05' - Fractures, 80 deg, rough, undulating, tight			
	R9-NQ 5 ft 99%						



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
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-53.7	96.5 R10-NQ 5 ft 100%	50	10	94.45' - Fracture, <10 deg, rough, undulating, tight	[Symbolic Log]	Limestone 86.5-91.4' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak to weak (R0 to R2), voids <3/16" over 30%, moderately to highly fossiliferous, fossil casts and molds less than 1"x1/2"; cavity zones from 87.1-88.45' and 90.0-91.4'; trace unfilled cavities 1-1/2"x1"; heavily bioturbated or dissolution cavities over 25% of core, 20% filled with secondary infill of poorly indurated silts to extremely weak rock (R0) No Recovery 91.4-91.5' Limestone 91.5-93.05' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak to medium strong (R0 to R3), weak zones at 92.35-93.05'; voids <3/16" over 0-15% surface, poorly fossiliferous, trace organics Fat Clay To Elastic Silt (CH) 93.05-93.25' - olive gray, (5Y 3/2), strong HCl reaction, high plasticity from 93.05-93.15', moderate to low plasticity from 93.15-93.25', non-indurated silt Limestone 93.25-96.45' - Same as 91.5-93.05' except weak zones at 93.25-93.4' and 95.5-96.45'; at 94.3-95.5' voids <3/16" over 60% of surface and highly fossiliferous with fossil casts and molds up to 1/4" diameter No Recovery 96.45-96.5' Limestone 96.5-101.5' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), very fine to fine grained, strong HCl reaction, extremely weak (R0), medium strong (R3) zone from 99.3-100.2'; voids <3/16" cover 10-25% of surface, except voids <3/16" cover 40-60% of surface at 99.3-100.2'; moderately fossiliferous with fossil casts and molds to 1"x3/4", trace secondary infill in casts, trace organics, trace laminae. 101.5-106.4' - Same as 96.5-101.5' except extremely weak to weak (R0 to R2), voids <3/16" cover 10-25% No Recovery 106.4-106.5'	R9: 14 minutes	
			1	94.8-95.2' - Fractures, 80 deg, rough, undulating, tight				
			NR	95.45' - Fracture, 65 deg, rough, undulating, tight				
			2	95.65' - Bedding plane, horizontal, smooth, undulating, along bedding plane, tight				
			1	96.65' - Fracture or mechanical break, 20 deg, rough, undulating, tight to open 1/8"				
			2	97.15' - Fracture, 80-90 deg, rough, undulating, tight				
100				97.9' - Fracture, 70 deg, rough, undulating, tight				
-58.7				99.0, 99.2' - Mechanical break or bedding plane (2), <10 deg, rough, undulating, tight to open 1/8"				
				99.4' - Fracture, 85 deg, rough, undulating, tight				
				100.4, 100.6' - Fracture (2), 50 deg and 80 deg, smooth, undulating to stepped, tight				
	101.5 R11-NQ 5 ft 98%	86	10	100.85' - Mechanical break or bedding plane, <10 deg, smooth, undulating, tight		R10: 6 minutes		
			0	101.55, 101.6, 101.85, 101.95, 102.0' - Fractures or bedding plane (5), 70-90 deg and horizontal, rough, undulating, tight to open <1/4"				
			0	102.45' - Fracture, 60 deg, rough, undulating, tight				
			0	103.7, 104.0' - Mechanical break (2)				
			0					
			0					
			NR					
			1	107.2' - Fracture, 70 deg, rough, undulating, tight				
			10					
			2	108.3' - Fractures (3), 70-90 deg, rough, undulating, intersecting fractures, tight to open <1/4"				
	0	109.1, 109.25' - Fractures (2), 70 deg and horizontal, rough, undulating, intersecting fractures, tight to open <1/4"						
105								
-63.7								
	106.5 R12-NQ 5 ft 100%	86	0			R11: 5 minutes		
			0					
			0					
			0					
	110	86	0			R12: 7 minutes		
			0					
			0					
	111.5 R13-NQ 5 ft 100%	100	0					
			0					
			0	113.45, 114.05, 116.3' - Mechanical break (3)				
115								



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
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-73.7			0				
			0	115.45' - Mechanical break		Limestone 106.5-111.5' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to weak (R1 to R2), voids <3/16" over 20-50% of surface, moderately fossiliferous, fossil casts and molds <1/2" diameter, trace iron staining	SC-3 collected at 115.45-116.3' R13: 12 minutes
116.5			0				
	R14-NQ 5 ft 100%	96	0	119.05' - Mechanical break		Limestone 111.5-116.5' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, weak (R2), voids <3/16" over <20% of surface, trace laminations, poorly fossiliferous, few fossil molds 1/2"x1/4"	
120			0				
-78.7			2	120.7, 120.9' - Mechanical break or bedding plane (2), horizontal, smooth, undulating, tight to open 1/2"		116.5-120.7' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace laminations, voids <3/16" over 10-50% of surface (highly variable across length), moderately to heavily fossiliferous with fossil casts and molds up to 1/4" diameter, especially 117.5-118.0' and 118.5-119.5', laminated bedding from 116.85-117.0'	R14: 17 minutes
			1	121.95, 122.0' - Fractures (2), 50 deg and 30 deg, rough, undulating, intersecting fractures, open 1"		120.7-121.5' - Same as 116.5-120.7' except extremely weak (R0) rock to non-indurated silt, laminated from 120.7-120.9'	
	R15-NQ 5 ft 100%	94	3	123.95, 124.0, 124.25' - Bedding plane (3), horizontal, smooth, planar to stepped, tight		121.5-123.6' - yellowish gray to grayish orange, (5Y 8/1 to 10YR 7/4), very fine to fine grained, strong HCl reaction, weak (R2), voids to 3/16" over 50% of surface, decreasing with depth, fossil casts and molds to 1/2"x1/4" over 30% of surface.	R15: 12 minutes
125			0			123.6-126.55' - Same as 121.5-123.6' except voids to 3/16" over 20-40% of surface, trace fossil molds and casts to 1/4" diameter, possibly bioturbated 123.6-126.55'	
-83.7			0			126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
			1	127.2, 130.45, 131.0, 131.05, 131.35' - Fractures (5), <10 deg, smooth, planar to undulating, along bedding planes, tight to open 1/4"		126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
	R16-NQ 5 ft 99%	89	0	130.1' - Mechanical break		123.6-126.55' - Same as 121.5-123.6' except voids to 3/16" over 20-40% of surface, trace fossil molds and casts to 1/4" diameter, possibly bioturbated 123.6-126.55'	R16: 11 minutes
130			0			126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
-88.7			4	131.55, 133.9' - Fractures (2), horizontal, smooth, planar, along bedding planes, tight		126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
			NR			126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	SC-4 collected at 133.9-134.7'
			1			126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
	R17-NQ 5 ft 99%	98	1			126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
135						126.55-131.45' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 10-20% of surface except 130.15-130.85' voids to 3/16" over 60% of surface, poorly to moderately fossiliferous except 130.15-130.85' highly fossiliferous, with casts and molds to 1/2"x1/4", trace infill material	
						No Recovery 131.45-131.5'	



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
 WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitely, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-93.7			2	134.7, 135.1' - Bedding plane or mechanical break (2), 10-20 deg, smooth, undulating, trace organics, tight		Limestone 131.5-136.45' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak to weak (R0 to R2), voids to 1/16" covering 10-30% of surface, decreasing with depth, except voids to 3/16" over 60-70% of surface from 131.6-133.05', trace fossils, except highly fossiliferous 131.6-133.05', with casts and molds to 3/4"x1/2", trace infill in fossil casts No Recovery 136.45-136.5' Limestone 136.5-141.4' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 5-30% of surface, decreasing with depth, poorly to moderately fossiliferous, fossil casts and molds to 3/4"x1/4", secondary infill extremely weak rock (R0) and void <3/16" over 30-40% in infill, several bioturbation or dissolution cavities with secondary infilling up to 2" x 1" No Recovery 141.4-141.5' Limestone 141.5-143.6' - light olive gray to moderate yellowish brown, (5Y 5/2 to 10YR 5/4), very fine to fine grained, weak to medium strong (R2 to R3), voids <3/16" over 20-30% of surface moderately fossiliferous, fossil molds <1/2" diameter, many cavities <1-1/2"x1/2" comprising 20% of surface, several (<50% of cavities) with secondary infill, trace organic laminations 143.6-146.35' - Same as 141.5-143.6' except moderate HCl reaction, voids <3/16" over <5%-30% variable, trace laminated bedding especially 143.8-144.0' and 145.9-146.0', poorly fossiliferous No Recovery 146.35-146.5' Limestone 146.5-149.6' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), very fine to fine grained, weak to medium strong (R2 to R3), strength increasing with depth, except very weak rock (R1) at 149.35-149.6', voids <3/16" over <20% of surface, poorly fossiliferous, trace cavities with secondary infill <1"x1/2" 149.65, 140.2, 140.65' - Fractures or mechanical break (3), rough, undulating, along bedding planes, open <1/2" 140.65, 140.95' - Fracture zone, rough, undulating, fragments <1-1/2" diameter 142.45, 142.55' - Fracture zone, rough, undulating, fragments <1/2" diameter, angular, open <1" 142.9, 143.1, 143.25, 143.35, 143.55' - Fractures (5), <10 deg, rough, undulating, tight to open <1" at 143.25-143.35', with angular rock fragments <1" diameter 143.8' - Fracture, horizontal, smooth, undulating, along bedding plane, tight 144.0, 144.5' - Mechanical break (2) 144.9' - Fracture, <10 deg, smooth, undulating, tight 145.95' - Fracture, <10 deg, smooth, undulating, along bedding plane, tight to open <1/4" 146.6' - Fracture, horizontal, rough, undulating, along bedding plane, open <1/4" 149.55' - Fracture, horizontal, smooth, undulating, along bedding plane, open <1/4" 152.1, 153.0, 153.15, 153.25, 153.35, 153.7' - Fractures or mechanical break (6), along bedding planes, smooth to rough, undulating, tight 152.9' - Mechanical break 153.9, 154.15, 154.4' - Mechanical break (3) 154.0' - Mechanical break	
			0				
	136.5		NR				
			1				
			0				
	R18-NQ 5 ft 98%	86	0				
140			1				
-98.7			>10				
	141.5		NR				
			1				
			10				
	R19-NQ 5 ft 97%	75	2				
145			1				
-103.7			1				
	146.5		NR				
			1				
			0				
	R20-NQ 5 ft 100%	98	0				
150			1				
-108.7			0				
	151.5		1				
			3				
	R21-NQ 5 ft 100%	90	1				
155							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-04	SHEET 9 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
WATER LEVELS : 0.1 ft bgs on 03/26/07 START : 3/25/2007 END : 3/27/2007 LOGGER : R. Bitley, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-113.7			0	154.95, 156.3' - Mechanical break	Limestone 149.6-151.5' - Same as 146.5-149.6' except moderate HCl reaction, voids <3/16" over <10-20% of surface, variable, poorly fossiliferous, trace laminations, trace cavities <1/4" diameter 151.5-153.0' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, medium strong (R3), voids <3/16" over <20% of surface, poorly fossiliferous, trace dissolution cavities <1/2"x1/4", trace laminations 153.0-153.7' - Same as 151.5-153.0' except very weak (R1), highly laminated, cavities < 1"x1/4" over 30-40% of surface, trace organics 153.7-154.9' - Same as 151.5-153.0' 154.9-156.5' - Same as 151.3-153.0' except very weak rock (R1) at 154.9-155.4', voids <3/16" over <20% of surface, moderately fossiliferous, trace cavities 1-1/2"x1/2" with secondary infill 156.5-161.4' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), very fine to fine grained, strong HCl reaction, weak (R2), voids <3/16" over <5%-30% of surface, voids over 30% occur at 156.3-157.3' and 160.1-160.9', extremely weak to very weak bedding planes <1/2" thick at 158.65' and 160.9', poorly to moderately fossiliferous, fossil molds and casts <1/2"x1/4", trace laminations, trace secondary infill of cavities <2"x1" No Recovery 161.4-161.5' Bottom of Boring at 161.5 ft bgs on 3/27/2007	R21: 22 minutes	
	156.5		0				
			1	156.55' - Fracture or mechanical break, horizontal, rough, undulating, open <1/4"			
			0				
	R22-NQ 5 ft 98%	96	0	158.65, 160.9' - Mechanical break (2) 158.85, 158.95, 159.10, 160.1' - Mechanical break (4)			
			0				
160 -118.7			0				
	161.5		NR			R22: 9 minutes 10:30 03/27/07: Reach total depth at 161.5' with criteria at 80% recovery and 70% RQD	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-05	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/11/2007 LOGGER : T. Valentine, R. Bitley, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.0						Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08) 2-3/8" tricone roller bit
3.5						
5	0.7	SS-1	5-5-4 (9)	Poorly Graded Sand With Silt (SP-SM) 3.5-4.2' - moderate yellow to moderate olive brown, (5Y 7/6 to 5Y 4/4), wet, loose, 10-15% nonplastic fines, 30% very fine silica sand, trace iron cemented sand concretions to 1/8"		
37.0	5.0					
8.5						
10	1.2	SS-2	9-18-50/4 (68/10")	Silt (ML) 8.5-9.7' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 9% fine to medium sand-sized, all carbonate		
32.0	9.8					
13.5						
15	1.3	SS-3	25-28-31 (59)	Silt With Sand (ML) 13.5-14.8' - Same as 8.5-9.7' except 20% very fine to medium sand		
27.0	15.0					
17.5						
18.1	0.3	SS-4	33-50/1 (83/7")	Silt With Sand (ML) 17.5-17.8' - Same as 13.5-14.8' except lens of fine to coarse sand-sized material from 18.6-18.7'		
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-05	SHEET 2 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitley, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.0						
23.5						
24.2	0.6	SS-5	25-50/2 (75/8")	Silty Sand (SM) 23.5-24.1' - dark yellowish orange, (10YR 6/6), wet, very dense, mild to moderate HCl reaction, fine to coarse sand, 35% nonplastic fines, all carbonate		
25						
17.0						
28.5						
29.7	0.9	SS-6	8-8-50/2 (58/8")	Silty Sand (SM) 28.5-29.4' - Same as 23.5-24.1' except fragmented limestone lenses 1/4"-1/2" thick at 28.75' and 29.4'		
30						
12.0						
33.5						
35.0	1.2	SS-7	13-16-7 (23)	Silty Sand With Gravel (SM) 33.5-34.7' - dark yellowish orange, (10YR 6/6), wet, medium dense, mild to moderate HCl reaction, fine to coarse sand, 25% fine to coarse gravel, 30% nonplastic fines, all carbonate		
35						
7.0						
38.5						
38.6	0.0	SS-8	50/1.5 (50/1.5")	No Recovery 38.5-38.6'		Driller's Remark: Intermittent heavy chatter on drilling 37.0-38.5' Driller's Remark: Very dense material, difficult drilling 37.0-40.0'
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-05	SHEET 3 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitley, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.0						
43.5 43.8	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, medium plasticity, mild to moderate HCl reaction, 20% sand and limestone fragments		
45 -3.0						
48.5 49.0	0.5	SS-10	50/4 (50/4")	Fat Clay (CH) 48.5-48.6' - pale olive, high plasticity Silt With Sand And Gravel (ML) 48.6-48.8' - moderate olive brown, (5Y 4/4), wet, low plasticity, rapid dilatancy, mild to moderate HCl reaction, 25% fine to coarse sand, 20% gravel		
50 -8.0						
53.5 54.3	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 dense, mild to moderate HCl reaction, fine to coarse sand, 25% nonplastic fines, 30% fine gravel limestone, all carbonate		Driller's Remark: Heavy chatter from rig
55 -13.0						
58.0 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		
60						



PROJECT NUMBER: 338884.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
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
58.0	R1-NQ 2 ft 80%	54	3		Limestone 58.0-59.7' - light olive gray, (5Y 5/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" on 50% of surface, cavities up to 1/2", microfossils with few macrofossils, 1" low to moderate plasticity silt at 59.5-59.6'	Driller's Remark: hard, switch to 3 7/8" rock core bit to depth R1: 2 minutes Even, continuous boring	
60 -18.0	60.0	NR	2		58.1' - Mechanical break, 10 deg, rough, stepped 58.3' - Mechanical break, 60 deg, rough, undulating		
	R2-NQ 1.5 ft 60%	31	>10		59.05' - Bedding plane or mechanical break, rough, undulating 59.45' - Fracture, 70 deg, smooth, undulating 60.0-60.4' - Fracture zone or mechanical break, multiple intersecting fractures, various angles, bedding plane fractures at 60.2', 60.25', and 60.4, rough to smooth, undulating to stepped, tight	R2: 2 minutes Short run to adjust tooling for 5' continuous run length	
	61.5	NR	NR		60.0-60.8' - Same as 58.0-59.7 except medium strong to very strong (R3 to R5), trace organic laminations, seams up to 1/16" thick, voids <3/16" over 60% of surface, few cavities up to 1x1/4" No Recovery 59.7-60.0' Limestone		
	R3-NQ 5 ft 75%	55	1		60.0-60.8' - Same as 58.0-59.7 except medium strong to very strong (R3 to R5), trace organic laminations, seams up to 1/16" thick, voids <3/16" over 60% of surface, few cavities up to 1x1/4" No Recovery 60.8-61.5 Limestone	SC-1 collected at 62.0-62.8'	
65 -23.0			1		61.5-65.25' - Same as 60.0-61.5' except moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), extremely weak (R0), voids up to 1/12" on 30% of surface, large cavities up to 3" with silt infill No Recovery 65.25-66.5' Limestone		
			6		61.5-65.25' - Same as 60.0-61.5' except moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), extremely weak (R0), voids up to 1/12" on 30% of surface, large cavities up to 3" with silt infill No Recovery 65.25-66.5' Limestone	R3: 9 minutes	
			NR		66.5-67.3' - Same as 61.5-66.5' except very weak to medium strong (R1 to R3), voids <1/16" over 10% of surface, trace cavity infill		
	R4-NQ 5 ft 98%	77	4		66.5-67.3' - Same as 61.5-66.5' except very weak to medium strong (R1 to R3), voids <1/16" over 10% of surface, trace cavity infill	SC-2 collected at 68.45-69.45'	
			3		67.3-68.1' - Same as 66.5-67.3' except weak to medium strong (R2 to R3), voids up to 3/16" over 50% of surface, cavities up to 1/2"		
70 -28.0			0		67.3-68.1' - Same as 66.5-67.3' except weak to medium strong (R2 to R3), voids up to 3/16" over 50% of surface, cavities up to 1/2"	R4: 13 minutes	
			1		68.1-68.45' - Same as 67.3-68.1' except very weak (R1), friable surface, no voids or cavities		
			1		68.45-71.4' - Same as 68.1-68.45' except dense, strong HCl reaction, medium strong (R3), voids up to 1/16" over 20% of surface, trace organics, microfossils	R5: 11 minutes	
			NR		68.45-71.4' - Same as 68.1-68.45' except dense, strong HCl reaction, medium strong (R3), voids up to 1/16" over 20% of surface, trace organics, microfossils No Recovery 71.4-71.5' Limestone		
			1		71.5-72.4' - Same as 68.45-71.4' except pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), very weak to weak (R1 to R2), voids <3/16" over 60% of surface	R5: 11 minutes	
			2		71.5-72.4' - Same as 68.45-71.4' except pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), very weak to weak (R1 to R2), voids <3/16" over 60% of surface		
	R5-NQ 5 ft 88%	55	3		72.4-72.65' - Same as 71.5-72.4' except extremely weak to weak (R0 to R2), few cavities 1/4 x 1/8"	R5: 11 minutes	
75 -33.0			1		72.4-72.65' - Same as 71.5-72.4' except extremely weak to weak (R0 to R2), few cavities 1/4 x 1/8"		
			>10		72.65-75.1' - Same as 72.4-72.65' except medium strong (R3), voids up to 3/16" over 50%, cavities up to 1/2x1/4" over 40%, sharp contact at 75.1'	R5: 11 minutes	
			NR		72.65-75.1' - Same as 72.4-72.65' except medium strong (R3), voids up to 3/16" over 50%, cavities up to 1/2x1/4" over 40%, sharp contact at 75.1'		
			>10		75.1' - Fracture, 20 deg, smooth, undulating 75.15, 75.25' - Mechanical break, horizontal, rough, undulating, 1/2" open 75.55' - Fracture, 50 deg, rough, undulating		



PROJECT NUMBER: 338884.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
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -38.0	R6-NQ 5 ft 94%	57	4		Limestone 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% Calcareous Silty Fat Clay (CH) 75.6-75.9' - moist, hard, high plasticity, strong HCl reaction 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 6/2), moist Limestone 76.85-78.65' - pale yellowish brown, (10YR 6/2), strong HCl reaction, extremely weak to weak (R0 to R2), trace laminations with organics, voids 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' except weak to medium strong (R2 to R3), voids up to 3/16" over 30-50% of surface 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" 80.50-81.20' - Same as 79.85-80.5' except yellowish gray, (5Y 8/1), very fine grained, medium strong (R3), voids up to 3/16" over 15% of surface, fossil molds No Recovery 81.2-81.5' Limestone 81.5-83.1' - Same as 80.50-81.20' except possible bioturbation 82.25-83.6' - few voids 83.1-85.6' - strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 70-80% of surface, cavities up to 3/4x1/2" over 30% of surface, few fossil molds, potential bioturbation 85.95-86.5' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" 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 4/2), very weak to medium strong (R1 to R3), voids <1/4" over 70 % of surface, cavities <1/2x1/4" over 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	R6: 18 minutes	
81.5		NR	3				
85 -43.0	R7-NQ 5 ft 100%	83	2			SC-3 collected at 82.45-83.25'	
86.5			0			R7: 13 minutes	
90 -48.0	R8-NQ 5 ft 90%	67	1				
91.5			>10			R8: 12 minutes	
95 -53.0	R9-NQ 5 ft 86%	48	5				
96.5			3			R9: 14 minutes	
			>10				



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
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -58.0	R10-NQ 5 ft 40%	8	>10		Limestone 88.8-88.9' - Same as 87.9-91.0' except strong HCl reaction, mottled infilling with cavities, possible bioturbation, fossils prevalent No Recovery 91.0-91.5' Limestone 91.5-92.25' - very light gray and yellowish gray, (N8 and 5Y 8/1), strong HCl reaction, extremely weak to medium strong (R0 to R3), voids up to 1/4" over 30% of surface, cavities up to 1/2", infill and bioturbation Calcareous Fat Clay (CH) 92.25-92.60' - yellowish gray, (5Y 8/1), moist, stiff to hard, high plasticity, strong HCl reaction, carbonate derived Limestone 92.6-95.8' - Same as 91.5-92.25' No Recovery 95.8-96.5' 95.8-96.5" Limestone 96.5-98.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak (R0), friable, voids up to 1/4" over 30% of surface, few cavities with infill up to 1/4"x1/8", fossiliferous, trace organics No Recovery 98.5-101.5' Limestone 101.5-104.8' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids up to 3/16" over 50-70% of surface, cavities up to 1/2" over 30% of surface, fossiliferous with infilled cavities and fossil molds, trace organics 104.8-105.05' - Same as 101.5-104.8' except laminated bedding Limestone 105.05-106.5' - Same as 101.5-104.8 106.5-110.5' - Same as 104.8-105.05' except voids <1/4" over <20% of surface, many fossil casts and cavities up to 1/2" diameter No Recovery 110.5-111.5' Limestone 111.5-116.5' - Same as 106.5-111.5' except few cavities 3/4"x1/4" Limestone 116.5-118.7' - Same as 111.5-116.5' except secondary infill in a few fossil molds	R10: 5 minutes	
101.5			NR			SC-4 collected at 101.5-102.4'	
105 -63.0	R11-NQ 5 ft 100%	69	1				
			1				
			2				
			4				
			0				
110 -68.0	R12-NQ 5 ft 80%	53	>10			R11: 7 minutes	
			0				
			1				
			5				
			NR				
115 -73.0	R13-NQ 5 ft 100%	30	2			R12: 6 minutes	
			6				
			2				
			3				
			7				
			>10			R13: 8 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-05	SHEET 7 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
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -78.0	R14-NQ 5 ft 44%	12	>10 1 NR		No Recovery 118.7-121.5'	R14: 4 minutes	
121.5					Limestone 121.5-123.65' - Same as 116.5-121.5' except grading into weak rock with depth (R2)	SC-5 collected at 121.5-122.6'	
125 -83.0	R15-NQ 5 ft 100%	76	0 3 0 3 6		123.65-125.0' - Same as 121.5-123.65' except weak to medium strong (R2 to R3), highly fossiliferous, voids <1/4" over 50-70% of surface, cavities <3/4"x1/2" over 40% of surface 125.0-125.45' - Same as 123.65-125.0' 125.45-126.5' - Same as 123.65-125.0'	R15: 5 minutes	
126.5					Limestone 126.5-131.4' - very fine to fine grained, strong HCl 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'), cavities (<1/4") over 20% of surface from 129.6-131.4', fossiliferous (molds/casts), 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	R16: 7 minutes	
130 -88.0	R16-NQ 5 ft 98%	82	2 0 0 0 NR		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 No Recovery 131.4-131.5'		
131.5					Fat Calcareous Clay (CH) 131.5-131.55' - yellowish gray, (5Y 7/2), moist to wet, soft, high plasticity		
135 -93.0	R17-NQ 5 ft 100%	54	>10 1 1 5 7		Limestone 131.55-132.6' - 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	R17: 6 minutes	
136.5							



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

WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
140 -98.0	R18-NQ 5 ft 100%	58	2	135.4' - Fracture, 30 to 50 deg, smooth, undulating	|	132.6-133.0' - Same as 131.55-132.6' except light olive brown, (5Y 5/2), very fine to fine grained, weak to medium strong (R2 to R3), few fossils, voids <1/4" over 5% of surface, fossil molds <1/8" 133.0-136.5' - Same as 131.55-132.6' Limestone 136.5-137.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), variable 0-30% 15-20% of surface, cavities (<1/2"), variable 15-20% of surface, fossiliferous, trace molds and laminated bedding, rare secondary infill of cavities 137.1-137.25' - Same as 136.5-137.1' except pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium strong (R3) 137.25-139.75' - Same as 136.5-137.1' 139.75-140.0' - Same as 137.1-137.25' 140.0-141.5' - Same as 136.5-137.1' Limestone 141.5-145.5' - dark yellowish brown to pale yellowish brown, (10YR 4/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), with extremely weak (R0) zone at 141.6-141.65', voids (<3/16") over 10-50% of surface, cavities and fossil molds (up to 1" diameter) over 40% of surface, about 50% of cavities have secondary infill, very fossiliferous (molds) 145.5-145.8' - pale yellowish brown, (10YR 6/2), very fine grained, strong HCl reaction, medium strong (R3), laminated bedding, voids (<3/16") over 0-20% of surface No Recovery 145.8-146.5' Limestone 146.5-151.4' - pale yellowish brown, (10YR 6/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 0-20% of surface (voids <1/4" over 80% of surface from 150.7-151.05'), few cavities <3/4"x1/2", few cavities with infill, fossiliferous 150.7-151.4' - Same as 146.5-150.7' except voids <1/4" over 80% of surface No Recovery 151.4-151.5'	R18: 7 minutes		
			0	135.55, 135.6, 135.80, 136.3, 136.5' - Fractures, <10 deg, smooth, undulating 136.65, 136.75, 137.05, 137.1, 137.2, 137.25, 137.4, 137.6' - Bedding plane, 0 to 10 deg, smooth, undulating					
			5	138.4' - Fracture, 15 deg, rough, undulating 139.65, 139.75, 140.0, 140.3, 140.35, 140.9, 141.1, 141.15, 141.3, 141.45, 141.5' - Bedding plane, horizontal and <10 deg, undulating, rough to smooth					
			5	141.65' - Bedding plane, <10 deg, smooth, undulating 142.6' - Mechanical break					
			1	143.35' - Fracture or mechanical break, 20 deg, rough, stepped					
	145 -103.0	R19-NQ 5 ft 86%	42	4				143.65' - Fracture, horizontal, rough, undulating 144.05' - Fracture, horizontal, rough, undulating 144.3-145.05' - Fracture zone, rough, intersecting fractures at various angles, <1" gravel, angular, stepped to undulating, partial recovery	R19: 24 minutes
				>10				145.25' - Bedding plane, horizontal, rough, undulating 145.45' - Fracture, vertical, smooth, undulating	
				5				145.55, 145.65, 146.15' - Bedding plane, horizontal, smooth, undulating	
				NR				145.8, 146.05, 146.35' - Fractures (3), vertical, smooth, undulating 147.45' - Bedding plane, horizontal, smooth, undulating	
				NR				148.35' - Mechanical break 149.15, 149.25, 149.75, 150.0, 150.75, 151.4' - Bedding plane, horizontal and <10 deg, smooth, undulating	
150 -108.0	R20-NQ 5 ft 98%	90	1	152.75, 153.2, 153.35' - Mechanical break	R20: 10 minutes				
			0	153.85, 153.9, 154.05, 154.15, 154.3, 154.35, 154.9, 155.0' - Bedding plane, 0 to 10 deg, smooth, undulating					
			2	155.55, 155.65' - Mechanical break					
			2	156.6' - Bedding plane, horizontal, smooth, undulating					
			0	157.6' - Mechanical break					
			NR						
155 -113.0	R21-NQ 5 ft 94%	80	6		R21: 11 minutes				
			2						
			0						
			NR			SC-6 collected at 146.5-147.4'			
			NR			SC-7 collected at 156.55-157.55'			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-05	SHEET 9 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
 WATER LEVELS : 3.5 ft bgs on 3/06/07 START : 2/26/2007 END : 3/1/2007 LOGGER : T. Valentine, R. Bitely, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
160 -118.0	R22-NQ 5 ft 96%	71	8 6 0 0	157.75, 157.8, 157.9, 158.0' - Bedding plane, horizontal, smooth, undulating 158.1' - Fracture, vertical, smooth, undulating 158.15, 158.25, 158.3' - Bedding plane or mechanical break, 0 to 90 deg, smooth, undulating 158.6, 158.65, 158.75, 158.9, 159.15' - Bedding plane, horizontal, smooth, undulating 160.1, 160.65, 161.05' - Mechanical break	Limestone 151.5-154.95' - Same as 150.7-151.05' except yellowish gray to dark yellowish brown, (5Y 7/2 to 10YR 4/2), weak to medium strong (R2 to R3) 151.60-151.65' - Same as 151.5-154.95' except voids <1/4" over 60% of surface 151.65-153.2' - Same as 151.60-151.65' except no voids, few cavities <1/4" diameter 153.2-154.2' - Same as 151.65-153.2' except voids <1/8" over 30-60% of surface 154.2-154.92' - Same as 153.2-154.2' except highly laminated with organics, voids <1/4" over <10-20% of surface Limestone 154.95-156.2' - Same as 154.2-154.92' except very weak to weak (R1 to R2), voids <1/8" over <10-20% of surface No Recovery 156.2-156.5' 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 surface 157.95-158.6' - Same as 156.5-157.95' except pale yellowish brown to very light gray, (10YR 6/2 to N8), very fine grained, medium strong (R3), <10% voids over surface, few cavities <1/4"x1-1/2" with infill 158.6-161.3' - Same as 157.95-158.6' except yellowish gray, (5Y 7/2), very fine to fine grained, weak (R2), voids <1/4" over 40-70% of surface, cavities up to 1"x1/2" over 30% of surface No Recovery 161.3-161.5' Bottom of Boring at 161.5 ft bgs on 3/1/2007	R22: 12 minutes	
161.5		NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 1 OF 9
SOIL BORING 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
 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 : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
42.5			6"-6"-6" (N)			
3.5						
5	1.3	SS-1	4-4-4 (8)	Poorly Graded Sand With Silt (SP-SM) 3.5-4.1' - dark yellowish orange, (10YR 6/6), wet, loose, very fine to fine grained, 10-15% nonplastic fines, trace organics, trace coarse sand-sized iron cemented sand concretions, sand is silica Clayey Sand (SC) 4.1-4.8' - pale yellowish brown, (10YR 6/2), moist, loose, very fine to fine grained, 40% medium to high plastic fines, trace organics, sand is silica		
37.5	5.0					
8.5						
10	1.0	SS-2	5-5-6 (11)	Silt (ML) 8.5-9.5' - dark yellowish orange, (10YR 6/6), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine grained sand, 5% medium to coarse grained sand, all carbonate		
10	10.0					
13.5						
15	0.8	SS-3	38-50/5.5 (88/5.5")	Silt With Sand (ML) 13.5-14.25' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% very fine sand-sized, 5% medium sand-sized, trace fine gravel-sized, all carbonate		
15	14.5					
18.5						
18.7	0.2	SS-4	50/2 (50/2")	Limestone Fragments 18.5-18.7' - grayish orange, (10YR 7/4), mild HCl reaction, fragments to 3/8"		Driller's Remark: Hard layer 18.0-21.0'
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 2 OF 9
SOIL BORING 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
 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 : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.5			6"-6"-6" (N)			
23.5						
25	1.1	SS-5	10-13-24 (37)	Silty Sand (SM) 23.5-24.6' - grayish orange, (10YR 7/4), wet, dense, rapid dilatancy, moderate HCl reaction, fine to coarse sand, 47% nonplastic fines, 3/4" thick limestone lense at 24.4-24.5', all carbonate		Driller's Remark: Very hard layer 25.5-27.0'
17.5						
28.5						
30	1.4	SS-6	31-50-50/5 (100/11")	Silt With Sand (ML) 28.5-29.9' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 30% fine to medium sand-sized (amount varies in lenses), all carbonate		Driller's Remark: Very hard layer 30.0-35.0'
12.5						
33.5						
35	0.3	SS-7	50/3.5 (50/3.5")	Limestone Fragments 33.5-33.8' - grayish orange, (10YR 7/4), mild HCl reaction, gravel-sized fragments (1/16"-1"), 75% coverage of <1/16" voids on fragment surfaces		
7.5						
38.5						
38.8	0.3	SS-8	50/3 (50/3")			Driller's Remark: Hard layers 38.0-38.5' and 38.5-42.0'
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 3 OF 9
SOIL BORING 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
 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 : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
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		Dense drilling 40.0-43.0', light chatter variable
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 fragments (1/16"-1"), 2" silt lense (ML) at bottom of sample		
45						
45-2.5						
48.5						
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" 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		
50						
50-7.5						
50.0						
53.5						
53.9	0.4	SS-11	50/5 (50/5")	Limestone Fragments 53.5-53.9' - light olive gray, (5Y 5/2), moderate HCl reaction, sand and gravel-sized		
55						
55-12.5						Dense drilling 56.0-57.0', light chattering
58.5						
58.5	0.1	SS-12	50/1 (50/1")	Limestone Fragments 58.5-58.6' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, only a single 2" fragment Begin Rock Coring at 58.5 ft bgs See the next sheet for the rock core log		Stop drilling at 18:30 on 3/6/07, set HW casing to 40'
58.6						
60						



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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
58.5	R1-NQ 3 ft 97%	68	2	58.7, 59.4' - Mechanical break (2) 58.85, 59.1, 59.5' - Bedding plane (3), 40 deg, smooth, undulating	Limestone 58.5-61.4' - pale yellowish brown, (10YR 6/2), very fine to fine grained, strong HCl reaction, medium strong (R3) at 58.5-59.0' grading to very weak (R1) at 59.0-61.4', 80% coverage of <1/16" voids on surface from 58.5-59.0', trace voids and few cavities <1/4" diameter from 59.0-61.4'	3/7/07 advanced HW casing to 58.5'	
60 -17.5			4	60.25' - Bedding plane or fracture, horizontal, smooth, undulating, intersecting high angle fracture			
61.5			3	60.3' - Fracture, 75 deg, smooth, undulating 60.8, 61.0' - Bedding plane (2), horizontal, smooth, undulating 60.9' - Fracture, 80 deg, smooth, undulating, tight			
65 -22.5	R2-NQ 5 ft 92%	62	NR	62.55, 62.65' - Bedding plane (2), horizontal, smooth, undulating	No Recovery 61.4-61.5' Limestone 61.5-66.1' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate to strong HCl reaction, very weak to medium strong (R1 to R3), 60% coverage of <1/16" voids on surface from 64.75-65.25', trace voids and few cavities up to 3/4"x1/12" 61.5-64.75' and 65.25-66.5', trace organics in laminations	R1: 3 minutes	
66.5			0	62.65-62.8' - Fracture zone, rough, undulating, >10 fractures at various angles			
65			>10	63.1, 63.2, 63.6' - Fractures or mechanical break (3), smooth to rough, undulating, low angle			
66.5			2	64.1, 65.0' - Bedding plane or mechanical break (2), smooth to rough			
70 -27.5	R3-NQ 5 ft 76%	40	2	64.45-65.95' - Fracture zone, rough, undulating, 5+ fractures at intersecting angles	No Recovery 66.1-66.5' Limestone 66.5-70.3' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), fine grained, moderate to strong HCl reaction, very weak to medium strong (R1 to R3), hardness increasing with depth, 60% coverage of <1/16" voids on surface, no cavities 68.15-70.3', 67.7-67.8' silt lense, carbonate, low plasticity	R2: 10 minutes	
66.5			NR	65.75' - Bedding plane, smooth, undulating			
70			>10	65.75' - Fracture, 40 deg, smooth, undulating 66.5-67.8' - Fracture zone, rough, undulating to stepped, intersecting fractures at various angles			
71.5			2	68.05, 68.15' - Bedding plane or mechanical break (2), <10 deg, rough to smooth, undulating			
75 -32.5	R4-NQ 5 ft 76%	68	0	69.25, 69.4' - Bedding plane, <10 deg, smooth, undulating	No Recovery 70.3-71.5' Limestone 71.5-75.3' - pale yellowish brown to very light gray, (10YR 6/2 to N8), very fine to fine grained, moderate HCl reaction, medium strong (R3) at 71.5-75.15', very weak to extremely weak (R1 to R0) at 75.15-75.3', 25-75% coverage of <1/16" voids on surface, many cavities <1/4" diameter with few cavities <1/2" (fossil molds), fossiliferous	R3: 8 minutes	
71.5			NR	69.75, 71.85, 72.5, 74.9' - Mechanical break (4)			
75			1	72.1, 72.6' - Bedding plane (2), <10 deg, smooth, undulating			
76.5			1	74.05' - Fracture, 20 deg, smooth, undulating			
76.5	NA	NA	3	74.5, 74.65' - Bedding plane (2), <10 deg, smooth, undulating	No Recovery 75.3-76.5' Limestone 76.5-76.9' - pale yellowish brown, (10YR 6/2), very fine to fine grained, strong HCl reaction, very weak (R1), 20% coverage of <1/16" voids on surface	R4: 16 minutes	
76.5			NR	75.15' - Fracture, 20 deg, rough, undulating			
76.5			>10	76.5-76.6' - Fracture zone, rough, undulating to stepped, trace silt infill			
76.5	NA	NA	NA	76.7' - Mechanical break or bedding plane, <10 deg, rough, undulating			
76.5	NA	NA	NA	76.9, 78.25' - Clay seam (2), clay contact			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 5 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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION							
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS							
80 -37.5	R5-NQ 5 ft 86%	20	0	78.4' - Mechanical break or bedding plane, <10 deg, smooth, undulating		Fat Clay (CH) 76.9-78.25' - very pale orange, (10YR 8/2), moist, medium stiff to stiff, low dilatancy, moderate to high plasticity, 30% silt Limestone 78.25-80.8' - very light gray to dark yellowish brown, (N8 to 10YR 4/2), very fine to fine grained, weak to 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' 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 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' 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 <3/16" voids on surface, 30% 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 HCl reaction, very 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 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 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	Laminated organics varve-like deposition at 79.4-79.5'				
		4	0	78.55' - Mechanical break or fracture, 50-70 deg, smooth, undulating							
		NR	0	78.75, 79.2, 79.3' - Bedding plane (3), <10 deg, smooth, undulating							
	85 -42.5	R6-NQ 5 ft 86%	>10	2	81.6' - Fracture or mechanical break, <10 deg, rough, undulating		85.85-85.8' - Fracture zone, rough, undulating, multiple intersecting fractures at various angles 82.25, 83.2, 83.4, 84.6' - Mechanical break or fractures (4), rough, stepped to undulating, variable angularities 85.3' - Mechanical break or fracture, 0-50 deg, rough, stepped 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 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 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 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	R5: 10 minutes			
			2	0	81.8-82.0' - Fracture zone, rough, undulating, multiple intersecting fractures at various angles						
			NR	2	82.25, 83.2, 83.4, 84.6' - Mechanical break or fractures (4), rough, stepped to undulating, variable angularities						
		90 -47.5	R7-NQ 5 ft 76%	>10	4			85.3' - Mechanical break or fracture, 0-50 deg, rough, stepped		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 HCl reaction, very 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 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 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	R6: 16 minutes
				>10	NR			85.55-85.8' - Fracture zone, rough, undulating, multiple (<4) fractures, various angles			
				>10	0			87.2' - Fracture, 35 deg, rough, undulating			
			95 -52.5	R8-NQ 5 ft 90%	>10			10	87.35-87.8' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles		92.2-93.0' - Same as 91.5-92.2' except weak to medium strong (R2 to 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	R7: 23 minutes
>10					NR	87.95, 88.9, 89.3' - Mechanical break (3)					
NR					1	89.0' - Mechanical break or bedding plane, 40 deg, rough, undulating					
96.5				R8-NQ 5 ft 90%	>10	2		89.2-89.3' - Fracture zone, rough, undulating to stepped, intersecting fractures at various angles				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'
	2				1	91.6' - Fracture, vertical, rough, undulating					
	1				2	91.65' - Mechanical break or fracture, 15 deg, rough, stepped to undulating					
	NR				1	91.85' - Fracture, vertical, rough, undulating					
	NR	2			92.05-92.2' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles						
	NR	1			92.95' - Mechanical break or fracture, 25-70 deg, rough, undulating, variable fracture angle						
	NR	1			93.3' - Bedding plane, horizontal, smooth, undulating						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 6 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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
100 -57.5	R9-NQ 5 ft 82%	60	0	97.5, 99.6' - Mechanical break (2)		Limestone 93.0-94.1' - Same as 91.5-92.2' except weak to medium strong (R2 to R3), trace voids <3/16" and cavities 94.1-95.1' - Same as 91.5-92.2' except very weak to weak (R1 to R2), trace voids <3/16" and cavities 95.1-96.0' - Same as 91.5-92.2' except very weak to medium strong (R1 to R3), voids <3/16" over 60-80% of core surface, few cavities (<1/2"x1/4"), horizon of greenish black (5GY 2/1) fat clay (moist, soft to medium stiff, highly plastic, mild HCl reaction) at 94.25-94.35' No Recovery 96.0-96.85' Limestone 96.85-100.6' - pale yellowish brown, (10YR 6/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), 60% coverage of <3/16" voids on surface, 20% coverage of <3/4"x1/2" cavities on surface, fossiliferous No Recovery 100.6-101.5' Limestone 101.5-106.45' - pale yellowish brown, (10YR 6/2), very fine to fine grained, extremely weak to very weak (R0 to R1), 60% coverage of <3/16" voids on surface, few cavities <1/2" diameter, fossiliferous with fossil molds, trace organics No Recovery 106.45-106.5' Limestone 106.5-111.2' - pale yellowish brown, (10YR 6/2), very fine to fine grained, extremely weak to weak (R0 to R2), 30-70% coverage of <3/16" voids on surface variable and decreasing with depth, cavities up to 1/2" to 1/4", fossiliferous, fossil molds and casts No Recovery 111.2-111.5' Limestone 111.5-116.4' - pale yellowish brown, (10YR 6/2), very fine to fine grained, extremely weak to weak (R0 to R2), 40-70% coverage of <1/16" voids on surface variable, fossiliferous with fossil molds and casts <1/4" diameter No Recovery 116.4-116.5'	R9: 7 minutes	
			1	98.0-98.6' - Fracture zone, rough, stepped, multiple (>20) intersecting fractures at various angles, gravel sized fragments <3"				
			NR	100.2' - Mechanical break				
	105 -62.5	R10-NQ 5 ft 99%	97	0				101.95, 103.3, 103.6, 105.0' - Mechanical break (4)
				1				103.15' - Mechanical break or fracture, 40 deg, rough, stepped
				0				
				0				
	110 -67.5	R11-NQ 5 ft 94%	60	NR				
				2				106.85' - Fracture, 30 deg, rough, stepped
				1				107.4' - Fracture or mechanical break, 70 deg, smooth, stepped, open
2				108.5' - Bedding plane, horizontal, smooth, undulating, 1/2" open				
3				108.7' - Fracture or mechanical break, 60 deg, smooth, stepped				
0				109.0' - Bedding plane, horizontal, smooth, undulating				
NR				110.15, 110.25' - Bedding plane (2), <10 deg, rough, stepped				
115 -72.5	R12-NQ 5 ft 98%	92	1	110.4' - Bedding plane, <10 deg, smooth, undulating				
			1	110.85' - Mechanical break				
			2	112.35, 112.6' - Bedding plane (2), <10 deg, rough, undulating				
			1	114.0' - Fracture, 40 deg, smooth, undulating				
			0	114.35, 115.45' - Bedding plane (2), smooth, planar				
			NR	116.2' - Mechanical break				
			1					
			1	117.3' - Fracture, 70 deg, smooth, planar 117.55' - Fracture or mechanical break, 30 deg, rough, stepped				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 7 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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
120 -77.5	R13-NQ 5 ft 98%	92	1		[Symbolic Log Column]	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 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 HCl 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), 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) 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 HCl reaction, 20-40% coverage of <1/16" voids on surface, trace fossil molds or casts, interbedded with highly fossiliferous lenses up to 1" thick	R13: 9 minutes
			2	119.45, 119.7' - Fracture or mechanical break (2), 50 deg and 80 deg, rough, undulating			
	1	119.6' - Fracture or mechanical break, 60 deg, rough, planar					
	NR	120.95' - Fracture or mechanical break, <10 deg, rough, stepped					
	4	121.6, 121.65' - Bedding plane (2), <10 deg, smooth, stepped					
	1	122.0' - Mechanical break or fracture, <10 deg, rough, stepped					
	70	1	122.5' - Bedding plane, horizontal, smooth, undulating				
	0	122.65' - Mechanical break or fracture, 50 deg, rough, undulating					
	2	123.65, 123.9' - Fracture or mechanical break (2), 45 deg and 80 deg, rough, undulating					
	NR	2	125.7' - Bedding plane, horizontal, smooth, planar				
125 -82.5	R14-NQ 5 ft 90%	70	>10	125.9' - Bedding plane, horizontal, smooth, undulating	[Symbolic Log Column]		R14: 8 minutes
			3	126.5-126.83' - Fracture zone, smooth, undulating, multiple intersecting fractures, fragments up to 2" diameter			
	>10	126.85' - Bedding plane, horizontal, smooth, undulating					
	>10	127.15' - Bedding plane or mechanical break, rough, undulating					
	>10	127.7, 127.8, 128.0' - Bedding plane (3), <10 deg, smooth, undulating					
	>10	128.15' - Bedding plane or mechanical break, horizontal, rough, undulating					
	42	>10	128.5, 128.75, 128.9, 129.0' - Bedding plane (4), horizontal, rough, undulating				
	5	129.15-129.35' - Fracture zone, rough, stepped					
	3	129.55-129.65' - Fracture zone, rough, stepped					
	84	0	130.2, 130.8' - Bedding plane (2), rough, undulating				
130 -87.5	R15-NQ 5 ft 100%	42	0	131.0-131.5' - Fracture zone, rough, stepped to undulating	[Symbolic Log Column]		R15: 5 minutes
			2	131.6' - Bedding plane or mechanical break, rough, undulating, 1/2" open			
	2	132.2' - Bedding plane or mechanical break, smooth, planar					
	2	132.4' - Fracture or mechanical break, <10 deg, rough, stepped					
	0	132.5, 132.55' - Bedding plane (2), horizontal, smooth, undulating					
	0	133.2, 133.55' - Bedding plane (2), <10 deg, rough, undulating					
	0	134.85, 135.1' - Bedding plane (2), <10 deg, smooth, undulating					
	84	0	131.0-131.5' - Fracture zone, rough, stepped to undulating				
	2	131.6' - Bedding plane or mechanical break, rough, undulating, 1/2" open					
	2	132.2' - Bedding plane or mechanical break, smooth, planar					
2	132.4' - Fracture or mechanical break, <10 deg, rough, stepped						
84	0	132.5, 132.55' - Bedding plane (2), horizontal, smooth, undulating					
135 -92.5	R16-NQ 5 ft 100%	84	0	133.2, 133.55' - Bedding plane (2), <10 deg, rough, undulating	[Symbolic Log Column]		R16: 7 minutes
			0	134.85, 135.1' - Bedding plane (2), <10 deg, smooth, undulating			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
140 -97.5	R17-NQ 5 ft 100%	100	0	135.9, 135.95' - Fracture or mechanical break (2), 60 deg, rough, undulating, intersecting	[Symbolic Log]	Limestone 136.5-141.5' - very pale orange, (10YR 8/2), very fine to fine grained, extremely weak to weak (R0 to R2), <1/16" voids, highly fossiliferous (molds), interbedded with horizontal laminations up to 1 1/2" thick which are yellowish gray (5Y 7/6) and exhibit no fossils and few voids <1/16", large fossil cast 1" in diameter at 141.1' 141.5-144.95' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 8/2), very fine grained, medium strong (R3), 40-50% coverage of voids on surface, solution cavities up to 1 1/2" with secondary infill of fine grained limestone with voids over 80-90% of surface, all fossiliferous with multiple casts in matrix and secondary infill, organic staining occurring on fresh surface at 144.1-144.95' 144.95-145.9' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 5/2), very fine to fine grained, medium strong (R3), 20-40% coverage of <1/16" voids on surface, trace fossils, no cavities No Recovery 145.9-146.5' Limestone 146.5-151.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), fine grained, very weak to medium strong (R1 to R3), 50-80% coverage of <1/16" voids on surface, moderately fossiliferous, trace laminations, trace mottling/potential secondary infilling on cavities <1 1/2" No Recovery 151.4-151.5' Limestone 151.5-153.8' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 30-60% coverage of <3/16" voids on surface variable, fossiliferous, fossil molds and casts up to 1/2" to 1/4" 153.8-155.4' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), very fine to fine grained, extremely weak to weak (R0 to R2), poorly laminated bedding, highly fossiliferous, fossil molds and casts <1/4", organics on laminar partings, 60% coverage of <3/16" voids on surface, 20% coverage of <3/4" cavities on surface, 1" carbonate derived silt lens at 155.3-155.4'	R17: 11 minutes SC-5 collected at 142.5-143.75' R18: 38 minutes 1/4" clay infill at 151.2' R19: 8 minutes Stop drilling at 18:00 on 3/8/07 Resume drilling at 08:15 on 3/9/07 Driller's Remark: Depth to water before drilling at 1' below ground surface R20: 27 minutes	
			1	139.65' - Bedding plane or mechanical break, smooth, undulating				
			1	141.1' - Mechanical break, rough, undulating				
	1	142.2' - Fracture or mechanical break, 20 deg, rough, stepped, 1/2" open						
	0							
	2	143.8' - Mechanical break						
	>10	144.1, 144.3' - Mechanical break or fracture (2), <10 deg, rough, undulating to stepped, 1/4" open						
	0	144.6, 144.7, 144.9' - Mechanical break or fracture (3), horizontal, rough, undulating, organic staining						
	NR	144.9-144.95' - Fracture zone, smooth to rough, undulating to stepped, organic staining						
	3	145.6' - Mechanical break						
145 -102.5	R18-NQ 5 ft 88%	68	>10	146.9' - Mechanical break or bedding plane, <10 deg, smooth, undulating, 1/4" open				
			0	147.0' - Mechanical break				
			NR	147.2, 147.45, 147.65, 147.7, 147.8, 147.9, 148.15, 148.2, 148.3, 148.35, 148.5' - Mechanical break or bedding plane (11), <10 deg, smooth to rough, undulating				
	1	149.05' - Fracture, 40 deg, rough, undulating						
	0							
	1	151.2' - Clay seam, horizontal, 1/4" open, 1/4" clay infill						
	NR							
	0							
	1	152.45' - Mechanical break						
	5	153.3' - Fracture or mechanical break, horizontal, smooth, undulating, 1/4" open						
150 -107.5	R19-NQ 5 ft 98%	60	>10	153.8' - Fracture or mechanical break, horizontal, smooth, undulating				
			>10	153.95-154.65' - Mechanical break				
			0	154.1, 154.15, 154.2, 154.3, 154.35' - Bedding plane (5), <10 deg, smooth, undulating, <1/4" open				
	0	154.65' - Fracture or mechanical break, <10 deg, rough, undulating						
	NR	155.3-155.4' - Fracture zone, <10 deg, rough, stepped to undulating						
	2	156.1' - Mechanical break						
	4	156.65' - Bedding plane or mechanical break, horizontal, smooth, undulating, 1/4" open						
	155 -112.5	R20-NQ 5 ft 95%	73	5				
				>10				
				0				
NR								
2								
4								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-06	SHEET 9 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
 WATER LEVELS : 1.0 ft bgs on 03/09/07 START : 3/6/2007 END : 3/9/2007 LOGGER : R. Bitely, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
160 -117.5	R21-NQ 5 ft 99%	76	5	157.05' - Fracture or mechanical break, 30 deg, rough, stepped, 1/2" open, silt size infill 158.0' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" open 158.25, 158.35, 158.45' - Fractures or mechanical break (3), horizontal, smooth to rough, undulating, 1/4" open 158.6' - Bedding plane, rough, undulating, 1/4" open 158.8, 158.83, 158.85, 158.9' - Bedding plane or mechanical break (4), smooth to rough, undulating, 1/4" open 159.45' - Fracture, 60 deg, rough, undulating, 1/4" open 160.45' - Mechanical break	155.4-156.25' - Same as 151.5-153.8' No Recovery 156.25-156.5' Limestone 156.5-157.8' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 40-70% coverage of <3/16" voids on surface, fossiliferous with molds and casts 157.8-159.0' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, medium strong (R3), interbedded, 10-30% coverage of <1/16" voids on surface, few fossils 159.0-161.4' - Same as 156.5-157.8' No Recovery 161.4-161.5' Bottom of Boring at 161.5 ft bgs on 3/9/2007	SC-6 collected at 160.45-161.45' R21: 27 minutes	
161.5							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 2.5 ft bgs on 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.3	0.0			Topsoil 0.0-0.1' - wood debris		
	1.0	SS-1	1-2-2-1 (4)	Poorly Graded Sand (SP) 0.1-1.0' - pale yellowish brown, (10YR 6/2), moist, very loose, no HCl reaction, very fine to fine grained silica sand to <1/16", trace nonplastic fines, trace organics		NR=No Recovery
2.0				2.0-2.4' - Same as 0.1-1.0' except color darkens with depth		
	1.4	SS-2	3-3-4-5 (7)	Poorly Graded Sand With Silt (SP-SM) 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 and roots, mottled, sand is silica		
5	4.0					
37.3	5.4	SS-3	2-2-50/5 (52/11")	Silty Sand (SM) 4.0-4.4' - moderate yellowish brown, (10YR 5/4), moist, loose, very fine to fine grained, low plasticity, no HCl reaction, 30% low plastic fines, trace organics, sand is silica		
	6.0					
	6.4	SS-4	50/5 (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 organics at contact with next material		
	8.0					
	0.8	SS-5	45-3-2-1 (5)	Silt With Sand (ML) 4.7-5.0' - yellowish gray, (5Y 8/1), moist, hard, nonplastic, very rapid dilatancy, moderate HCl reaction, 15-20% sand-sized, very fine to fine and scattered coarse-sized, all carbonate		
10	10.0					
32.3	1.9	SS-6	2-1-2-4 (3)	Silt (ML) 6.0-6.4' - yellowish gray, (5Y 8/1), wet, hard, nonplastic, very rapid dilatancy, moderate HCl reaction, some yellowish staining, 5-10% very fine to fine sand-sized, trace coarse sand-sized, all carbonate		
	12.0					
	1.5	SS-7	4-5-50/6 (55/12")	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 fragments sized carbonate material, has the appearance of beds, may be extremely weak limestone		
	13.5					
	14.0					
	14.2	SS-8	50/2 (50/2")	Silt (ML) 8.5-8.8' - Same as 6.0-6.4'		
15						
27.3	0.0			10.0-10.6' - Same as 6.0-6.4' except soft, 5-10% very fine sand sized, all carbonate		
				Silt With Sand (ML) 10.6-11.9' - Same as 10.0-10.6' except 10-15% fine to medium sand sized, trace fine gravel sized carbonate material, trace limestone lenses <1/2" thick		
	16.0			12.0-13.5' - yellowish gray, (5Y 8/1), wet, soft, nonplastic, very rapid dilatancy, sand-sized content varies, trace scattered fine gravel-sized, 1/6" thick lenses of limestone from 13.4-13.6', moderate HCl reaction in fines, mild to moderate HCl reaction in larger particles, all carbonate		Driller's Remark: 16.0-18.0' is hard, cuttings are brown limestone fragments
	1.1	SS-9	14-14-3-2 (17)			
	18.0					
	1.7	SS-10	2-3-6-3 (9)	No Recovery 14.0-14.2'		Driller's Remark: Softer at 18.0'
20						



PROJECT NUMBER: 338884.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
 WATER LEVELS : 2.5 ft bgs on 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.3	20.0	1.6	SS-11	1-2-27-50 (29)		
22.0	22.2	0.2	SS-12	50/2 (50/2")		Driller's Remark: 22.0-23.6' hard, becomes soft at 23.6'
24.0						Driller's Remark: Lost circulation at 24.0'
25	25.2	1.1	SS-13	9-26-50/2 (76/8")		
17.3	26.9	0.1	SS-14	50/1 (50/1")		Still have no circulation; install 4" HW casing; heavy chatter at 15.0-20.0' Finish drilling at 16:00 on 4/25/07 Resume drilling 2/26/07 at 8:00
28.0						
28.9	28.9	0.6	SS-15	6-50/5 (56/11")		
30	30.0					
12.3		1.3	SS-16	3-7-13-6 (20)		
32.0						
		2.0	SS-17	2-3-3-4 (6)		
34.0						
34.6	34.6	0.4	SS-18	45-50/1 (95/7")		
35						
7.3	36.0	0.0	SS-19	50/0 (50/0")		Shut down at 10:11 2/26/07 due to hydraulic leak on autohammer
	38.9	0.1	SS-20	50/1 (50/1")		Resume drilling 2/27/07 12:00 Driller's Remark: 38.0-40.0' hard, but no chatter
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-07	SHEET 3 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
 WATER LEVELS : 2.5 ft bgs on 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.3	40.0	1.9	SS-21	6-8-33-50/5 (41) Limestone Fragments 38.0-38.1' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, fragments <1/8" thick and wafer shaped, abundant fossil casts/molds		
41.8				Silty Sand (SM) 40.0-41.9' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, dense, fine to coarse grained, moderate to strong HCl reaction, 30-40% silt-sized, limestone fragments in thin bedded appearance at 41.6-41.9', sand-sized very friable and can crush with fingers, all carbonate		
43.4	1.3		SS-22	21-38-50/5 (88/11") Sandy Silt (ML) 42.0-43.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), stiff, low plasticity, no dilatancy, strong HCl reaction, trace black streaks, 30% fine sand-sized		Driller's Remark: Chatter starting at 43.0'
44.0				Silty Sand With Limestone Fragments (SM) 43.0-43.3' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), dense, 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		
45 -2.7	1.4		SS-23	14-15-17-24 (32) Sandy Silt (ML) 44.0-45.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to wet, hard, nonplastic, low to rapid dilatancy, strong HCl reaction, 40% fine sand, 1/2" limestone lens at 44.2'		
46.0				Silty Sand (SM) 46.0-46.3' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very dense, fine to coarse grained, strong HCl reaction, 40% medium plastic silt, last 0.1' has gravel-sized limestone fragment		
46.3	0.3		SS-24	50/4 (50/4") Limestone Fragments 48.0-48.1' - strong HCl reaction, 80% coverage of voids 1/16" or less on surface of fragments		
48.0				Sandy Silt (ML) 50.0-51.5' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to wet, hard, fine to coarse grained, moderate HCl reaction, 55% nonplastic fines, 3/4" to 1/2" limestone lenses		
48.9	0.1		SS-25	50/1 (50/1") Silty Sand (SM) 52.0-52.9' - Same as 50.0-51.5' except 40-50% low plastic fines, 1/2" poorly indurated limestone lens at 52.3'		
50 -7.7	1.5		SS-26	46-31-49-41 (80) No Recovery 54.0-54.1' Limestone Fragments 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		Driller's Remark: Very hard 56.0-57.0', softer at 57.0'
52.0	0.9		SS-27	4-14-50/4 (64/10") Limestone Fragments 58.0-58.1' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, 60% coverage of 1/16" voids on surface, fossil molds/casts, black streaks, very weak		Driller's Remark: Very hard 59.0-60.0'
53.3				Sandy Silt (ML) 50.0-51.5' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to wet, hard, fine to coarse grained, moderate HCl reaction, 55% nonplastic fines, 3/4" to 1/2" limestone lenses		
54.0	0.0		SS-28	50/1 (50/1")		
55 -12.7				Silty Sand (SM) 52.0-52.9' - Same as 50.0-51.5' except 40-50% low plastic fines, 1/2" poorly indurated limestone lens at 52.3'		
56.0	0.1		SS-29	50/1 (50/1")		
58.0				Limestone Fragments 58.0-58.1' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, 60% coverage of 1/16" voids on surface, fossil molds/casts, black streaks, very weak		
59.0	0.8		SS-30	25-50/6 (75/12")		
60						



PROJECT NUMBER: 338884.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
 WATER LEVELS : 2.5 ft bgs on 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.7	60.0	0.9	SS-31	5-50/6 (55/12")		
	61.0					
	62.0	0.0	SS-32	50/1 (50/1")		
	64.0					
65	64.8	0.8	SS-33	44-50/3 (94/9")		
-22.7	66.0	0.0	SS-34	50/0 (50/0")		Driller's Remark: Gets softer at 67.0'
	68.0					
	68.7	0.7	SS-35	17-50/2 (67/8")		
70	70.0					
-27.7	70.3	0.2	SS-36	50/4 (50/4")		Driller's Remark: Some chatter 70.0-71.0', softer at 71.0' faster drilling
	72.0					Driller's Remark: Hard at 71.5'
	73.4	0.7	SS-37	14-9-50/5 (59/11")		
	74.0					
75	74.0	1.8	SS-38	2-3-7-50/4 (10)		Driller's Remark: Very hard at 75.0'
-32.7	75.0	0.0	SS-39	50/0 (50/0")		Driller's Remark: Finish drilling at 18:10 on 2/27/07, will switch to rock coring at 76.0'
	75.9					
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-07	SHEET 5 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
76.0	R1-HQ 5 ft 100%	73	4	76.2-76.3' - Mechanical break, multiple	Limestone 76.0-81.0' - pale yellowish brown to very pale orange, (10YR 6/2 to 10YR 8/2), strong HCl reaction, no noticeable fossils, no solution cavities from 76.0-79.0', 16% coverage of solution cavities 3/8" or less in diameter at 79.0-81.0', 1-2 perfect elongate spherical solution cavities, limestone is fine grained at 76.0-76.9' and 79.2-81.0' (very pale orange), limestone becomes silty from 77.2-77.9'	Install HW casing to 76.0' Not able to retrieve inner core last interval due to catcher not grasping inner core barrel Begin rock coring at 76.0' After pulling core barrel, used A rods to flush hole with water to extract slough	
80			3	76.7' - Fracture, smooth, undulating, <3/4" silt infilling or silt seams			
80			1	77.2' - Fracture, horizontal, smooth, planar, <1-3/16", thick clayey silt			
80			1	77.4' - Fracture, horizontal, smooth, planar, <3/16" fines			
80			1	77.9' - Fracture, horizontal, smooth, planar, <3/8" silt			
80			1	78.2' - Fracture, 1-2 deg, rough, stepped, <3/4" friable fines			
81.0	R2-HQ 5 ft 100%	92	1	79.2' - Fracture, rough, stepped, <3/16" fines	81.0-81.3' - very pale orange, (10YR 8/2), strong HCl reaction, fine grained limestone, no fossils, no solution cavities 81.3-86.0' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, 20-30% microfossils, 50-70% silty matrix, 60-70% coverage of solution cavities 1/16" or less, 81.5-81.6' zone laminated dusky brown (5YR 2/2) organics	R1: 12 minutes SC-1 collected at 80.0-81.0'	
85			2	80.3' - Fracture, 30-40 deg, rough, stepped, <3/16" fines			
85			1	81.6' - Fracture, 1 deg, smooth, undulating, <5% fines, laminated organics			
85			1	82.3' - Fracture, 20-25 deg, rough, stepped, 20-30% mix of fines and sand sized grains			
85			1	82.9, 83.5' - Fracture (2), horizontal and 5-10 deg, rough, stepped, 20-30% mix of fines and sand sized grains			
85			0	84.8' - Fracture, rough, undulating, 20-30% mix of fines and sand size grains			
86.0	R3-HQ 5 ft 100%	93	1	86.4' - Fracture, 30 deg, sand to gravel size limestone grains	86.0-88.0' - moderate yellowish brown, (10YR 5/4), 30-50% fossil shells, molds and casts, 50-60% coverage of 3/8" or less solution cavities, 87.6' infilling of fat clay (CH) bluish gray (5B 9/1) to light bluish gray (5B 7/1), high plasticity and very moist 88.0-88.4' - pinkish gray, (5YR 8/1), dry, dense, strong HCl reaction, extremely weak to very weak (R0 to R1) 88.4-90.6' - pinkish gray, (5YR 8/1), dry, dense, strong HCl reaction, very weak (R1) 90.6-91.0' - pinkish gray, (5YR 8/1), strong HCl reaction, 70-90% silty matrix, no fossils observed 91.0-94.0' - Same as 90.6-91.0' except weak to medium strong (R2 to R3), noticeable fossil (shell fragments, casts), 10-20% coverage of voids 1/8" or less 94.0-96.0' - moderate yellowish brown, (10YR 5/4), 30-50% fossil shells, molds and casts, 50-60% coverage of solution cavities up to 3/8"	SC-2 collected at 83.7-84.7' R2: 8 minutes SC-3 collected at 89.6-90.6' R3: 11 minutes SC-4 collected at 91.7-92.6'	
90			1	87.6' - Fracture, 25 deg, rough, stepped, <3/4" fractured carbonate grains and up to 1-3/16" void filled with fat clay (CH)			
90			0	88.4' - Fracture, horizontal, smooth, undulating, <3/8" silty infilling			
90			1	90.6' - Bedding plane, horizontal, smooth, undulating			
95			2	92.5' - Fracture, horizontal, smooth, planar			
95			<7	92.8' - Fracture, horizontal, rough, undulating, infilled with 3/4" of medium plasticity clay/silt			
96.0	R4-HQ 5 ft 100%	70	0	93.3-93.7' - Fracture zone, rough, undulating, multiple fractures, low to high angle	R4: 12 minutes Driller's Remark: 95.0-96.0' soft		
95			0				
95	1						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100 -57.7	R5-HQ 5 ft 40%	0	NR	>10	95.4' - Fracture, planar, <2" thick, clays and silts 96.0-98.0' - Fracture zone, 0-90 deg, fractured material, most likely mechanical breaks	Limestone 96.0-97.0' - pinkish gray, (5YR 8/1), strong HCl reaction, 70-90% silty matrix, non fossiliferous No Recovery 97.0-100.0'	Driller's Remark: Sand lense 97.0-100.0'; core loss assumed to be from that interval No recovery in core barrel but residual material appears to be very fine to fine grained sand, poorly graded, white to light brown in color Driller's Remark: Advance HW casing past sand lense to 101.0' R5: 13 minutes Insert and set surface casing to 101.0' Stop drilling at 17:30 2/28/07 Resume drilling at 15:52 3/6/07 SC-5 collected at 102.4-103.4'
105 -62.7	R6-HQ 5 ft 86%	86	0	1	101.6' - Mechanical break, horizontal, rough, stepped, 3/4" of relief, open	Limestone 100.0-101.0' - medium yellowish brown, (10YR 5/4), strong HCl reaction, very weak (R1), 30-50% fossils shells, molds and casts, 50-60% solution cavities 101.0-105.3' - Same as 100.0-101.0' except solution cavities up to 3/4" in length (fossil molds)	R6: 8 minutes
110 -67.7	R7-HQ 5 ft 100%	100	0	1	105.3' - Mechanical break	No Recovery 105.3-106.0'	
115 -72.7	R8-HQ 5 ft 100%	100	0	0	107.5' - Mechanical break, 2-6 deg, rough, planar	Limestone 106.0-111.0' - very pale orange, (10YR 8/2), strong HCl reaction, weak to medium strong (R2 to R3), 20-40% coverage of solution cavities up to 3/16", no apparent bedding, silty matrix when reduced with rock hammer, 10-20% fossil evidence	SC-6 collected at 107.9-108.9' Driller's Remark: Softer drilling 109.0-111.0' R7: 14 minutes
						111.0-116.0' - Same as 106.0-111.0' except Very weak to weak (R1 to R2) at 114.0-116.0'	Very weak to weak interval identified as 109.0-111.0' on field log, it is assumed that 114.0-116.0' was intended SC-7 collected at 113.7-114.6' R8: 7 minutes



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
120 -77.7	R9-HQ 5 ft 100%	100	0			Limestone 116.0-121.0' - very pale orange, (10YR 8/2), 60-80% coverage of broken shells, fossil molds and casts, 20-30% coverage of 3/4" diameter solution cavities from 116.0-117.5', 20-40% silty and sandy matrix, black and translucent crystals very fine to fine grained, not the typical moderate yellowish brown fossiliferous limestone encountered towards upper portion 121.0-123.4' - light olive gray, (5GY 6/1), very fine to fine grained, strong HCl reaction, 30% coverage of 1/6" to 3/16" voids, 5% coverage of cavities 1/4" or less are dissolved fossils, fossiliferous 123.4-126.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, 15% coverage of voids 1/16" or less, laminated bedding of light silts as well as undulating laminae from 124.0-125.5' 126.0-127.7' - pale yellowish brown, (10YR 6/2), strong HCl reaction, 10-20% coverage of fossil shells and casts, no solution cavities, 10-30% coverage of voids 1/6" or less, 50-60% sand-sized matrix with black grains 1/16" or less 127.7-129.8' - very pale orange, (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 30-40% coverage of 3/8" or less solution cavities 129.8-130.1' - pale yellowish brown, (10YR 6/2), fine grained, medium strong (R3), no fossils 130.1-131.0' - Same as 127.7-129.8' 131.0-132.8' - very pale orange, (10YR 8/2 to 10YR 8/6), strong HCl reaction, extremely weak to very weak (R0 to R1), medium to coarse quartz grains and sand-sized carbonate grains, 30-40% fossils, 20-40% coverage of 1/16" or less voids 132.8-134.4' - very pale orange, (10YR 8/2), strong HCl reaction, very weak (R1), 10-20% fossils, voids (<1/16") over 10-20% of surface	SC-8 collected at 118.2-119.2'
			0				
			1	118.3, 119.5, 120.8' - Fractures (3), horizontal, rough, stepped			
			1				
			1				
	125 -82.7	R10-HQ 5 ft 100%	96	2			121.2, 121.6' - Mechanical break (2)
				0			
				2			123.4' - Fracture, smooth, undulating, limestone contact 123.5' - Fracture, 60 deg 124.3' - Fracture, 1-2 deg, smooth, undulating 124.6' - Fracture, 75 deg, rough, stepped, tight 125.8' - Fracture, 0-1 deg, rough, undulating
				1			
				1			
130 -87.7	R11-HQ 5 ft 100%	88	0				
			0				
			0				
			3	129.1, 129.5' - Fractures (2), 5 deg, rough, planar 129.9, 130.1' - Fractures (2), 5 deg, smooth, planar			
			1				
			2	131.2' - Bedding plane, horizontal, smooth, planar 131.99' - Fracture, rough, stepped 132.4, 132.5, 132.7' - Fractures (3), 7-20 deg, rough, stepped, irregular, minor silt infilling, open to 1/4"			
			0				
135 -92.7	R12-HQ 5 ft 100%	80	1	134.2' - Mechanical break, rough, stepped			
			3	135.1, 135.3, 135.6' - Bedding plane (3), 0-7 deg, smooth, planar			
			0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-07	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -97.7	R13-HQ 5 ft 82%	62	0		Limestone 134.4-135.5' - pale yellowish brown, (10YR 6/2), very fine grained, strong HCl reaction, laminar bedding, 5-6 3/8" in diameter solution cavities following silty laminae, <10% coverage of voids 1/16" or less on surface 135.5-137.5' - grayish orange pink, (10R 8/2), weak to medium strong (R2 to R3), fine grained with some medium to coarse sand-sized particles, sporadic 1/16" pyrite grains, 10-15% coverage of 1/16" or less voids Silt (ML) 137.5-137.8' - pale brown, laminar bedding	SC-12 collected at 137.8-138.7' Driller's Remark: Circulation lost at 139.5' R13: 13 minutes	
145 -102.7	R14-HQ 5 ft 100%	52	1		Limestone 137.8-139.5' - pale orange, (10YR 8/2), weak to medium strong (R2 to R3), 10-25% voids coverage of 1/16" or less, 10-20% fossils, 3/4" solution cavity with fat clay infilling at 139.5' 139.5-140.1' - grayish orange, (10YR 7/4), fine grained, weak to medium strong (R2 to R3), 10-20% fossil casts No Recovery 140.1-141.0' Limestone 141.0-144.0' - pale brown, (5YR 5/2), very weak to weak (R1 to R2), 20-30% coverage of 3/4" voids on surface, intact fossil casts and molds, no broken fossil shells, becomes more fossiliferous towards base (143.5-144.0') and increases in sand-sized grains, dense limestone but density decreases 143.2-144.0' as granularity increases 144.0-145.5' - pale yellowish brown, (10YR 6/2), very fine to fine grained, no visible fossils, laminar to thin bedded, 5-10% coverage of voids 1/16" or less 145.5-146.0' - pale brown, (5YR 5/2), strong HCl reaction, weak (R2), 10-30% sand-sized grain matrix 146.0-146.7' - very pale orange to grayish orange, (10YR 5/2 to 10YR 7/4), medium to coarse grained, weak to medium strong (R2 to R3), fossils up to 3/8", sand to gravel-sized grains 146.7-147.0' - fine grained, strong HCl reaction, weak (R2), silty laminae, silty matrix, no fossils, 15% coverage of voids 1/16" or less	Driller's Remark: Continuous circulation loss even while adding water to mud tub R14: 11 minutes	
150 -107.7	R15-HQ 5 ft 100%	98	0		141.8' - Fracture, 12-15 deg, rough, undulating, open up to 1/4", minor silt sized particle infilling 142.2, 142.3, 142.7' - Fractures (3), 5-10 deg, rough, planar, apparent orientation of fractures with solution cavities 142.8-143.8' - Fracture zone, variable orientation, fragments range from 1/2" to 2 1/2" 143.9' - Bedding plane, horizontal, smooth, planar 144.2, 144.6' - Bedding plane (2), horizontal, smooth, planar 144.6-146.0' - Fracture zone, fragments range from 1/2" to 3"x1" or larger 147.6, 155.7' - Mechanical break (2), load tests and machine breaks	SC-13 collected at 146.0-147.05'	
155 -112.7	R16-HQ 5 ft 100%	100	0		149.5, 149.6' - Bedding plane (2), 5-8 deg, rough, planar, <1/16" thick silty infilling on bedding plane partings 149.75' - Fracture, 80 deg, smooth, planar, tight 152.1, 152.5' - Fractures (2), horizontal, rough, planar, <3/8" thick unconsolidated silt 153.1' - Bedding plane, planar, undulating 155.2' - Fracture, rough, stepped, <1/16" silty infill	R15: 9 minutes SC-14 collected at 151.0-152.1' R16: 14 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-07	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
160 -117.7	R17-HQ 5 ft 100%	100	0			Limestone 147.0-149.7' - grayish orange to very pale orange, (10YR 7/4 to 10YR 5/2), mottled and variegated, fine to medium grained, strong HCl reaction, 10-20% 1/16" or less voids, sporadic echinoderms 3/8" to 9/16" 149.7-151.0' - fine grained, weak to medium strong (R2 to R3), 5-10% fossil casts, 5-10% coverage of 1/8" or less voids 151.0-151.8' - Same as 149.7-151.0' except very fine to fine grained 151.8-152.4' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, very weak to weak (R1 to R2), 10-20% coverage of voids 1/16" or less, silty matrix 152.4-153.1' - brown, (10YR 5/4), alternating silt and sand-sized carbonate layers at less than 1/8" thick, 5-10% coverage of 1/8" or less solution cavities, fossil molds at base, undulant to broadly undulant, thin to laminar bedding, unit exhibits slow but moderate HCl reaction, strong HCl reaction in very fine grained layers, exhibits differential compaction in very fine grained layers, dissolved fossils at/near 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 R2), voids 3/8" or less, 10-20% fossils (30% at 155.3') 156.6-161.0' - very pale orange, (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 161.0-165.3' - Same as 156.6-161.0' except very thin laminar bedding planes from 163.6-164.9', brown laminae increase in frequency from 164.4-164.9' 165.3-165.6' - fine to medium grained, moderate HCl reaction, very fine to fine grained laminae 165.6-166.0' - medium gray, (N5), medium to coarse grained, strong HCl reaction, weak to medium strong (R2 to R3), no visible fossils, no solution cavities	SC-15 collected at 157.5-158.4'		
			1	157.5, 160.4' - Fractures (2), 0-5 deg, smooth, undulating				R17: 9 minutes	
			0						
			0						
			1						
	165 -122.7	R18-HQ 5 ft 100%	86	0				SC-16 collected at 162.5-163.4'	
				0					
				0					
				1	164.7' - Fracture, horizontal, smooth, planar, minor silt infilling				Driller's remark: Feels gritty like sand
				3	165.3' - Fracture, horizontal, stepped, 1/8" relief, lithology contact, silt and sandy infill, <3/8" thick				
170 -127.7	R19-HQ 5 ft 100%	90	6	165.6, 165.8' - Fractures (2), horizontal, rough, planar, very fine to fine sandy infill, <3/8" thick		A variety of rock, mainly 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 energy (relatively) deposition is from 167.2-168.25', where the bedding becomes laminar to thin with very fine to fine grained laminae R19: 12 minutes SC-17 collected at 170.15-171.0' SC-18 collected at 172.7-174.0'			
			0	166.1-166.4' - Bedding plane, 0-5 deg, rough, planar					
			1	168.9' - Bedding plane, horizontal, smooth, stepped, consolidated silt/clay laminae, <3/16" thick					
			0						
			1	170.15' - Bedding plane, horizontal, rough, stepped, <3/16" thick					
			2	171.2, 171.9' - Mechanical break or bedding plane (2), 0-3 deg, planar, rough to smooth					
			4	172.1' - Fracture, horizontal, smooth, undulating, silty infill <1/8" thick					
175 -132.7	R20-HQ 5 ft 100%	68	0	172.2' - Fracture, horizontal, smooth, planar 172.5, 172.8' - Fractures (2), 10-15 deg, rough, planar					
			2	174.1' - Fracture, 5 deg, rough, stepped 174.6' - Fracture, 12 deg, rough, planar					
			6	175.1' - Fracture, 1-2 deg, rough, planar, <1/8" thick silty infill					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 2.5 ft bgs on 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
180 -137.7	R21-HQ 5 ft 100%	53	5	175.4-175.5' - Bedding plane, 0-3 deg, smooth, planar, 1/4" to 1/2" wafers	Limestone 166.0-167.5' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, sandy and silty sized matrix, fossil casts at base, 10-20% voids 3/16" or less, iron oxide stains and grains of pyrite 167.5-168.5' - grayish orange, (10YR 7/4), strong HCl reaction, 20-40% fossils, 20-40% coverage of solution cavities 3/8" or less, 20-30% coverage of voids 1/16" or less 168.5-169.8' - alternating very pale orange and pale yellowish brown, (10YR 8/2 to 10YR 6/2), thinly laminated bedding 169.8-171.0' - strong HCl reaction, very weak to weak (R1 to R2), no laminae, no visible fossils, 40-50% coverage of voids 1/16" or less 171.0-172.2' - grayish orange, (10YR 7/4), moderate HCl reaction, 1 solution cavity up to 3/8" wide and 1 3/16" long across surface, increase in silts below 172.0', becoming dark yellowish orange, voids 5/16" or less 172.2-172.5' - grayish orange, (10YR 7/4), very fine to fine grained, carbonate derived silt-sized particles 172.5-175.0' - Same as 171.0-172.2' 175.0-175.5' - Same as 171.0-172.2' except fine grained, mild HCl reaction, laminated 175.5-176.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, weak to medium strong (R2 to R3), <2% coverage of voids 1/16" or less, no visible fossils 176.0-176.9' - fine grained, strong HCl reaction, weak to medium strong (R2 to R3), silty matrix with very fine sand (<10%), very fine to medium sand-sized lense, void filling with mica mineral, 10-15% coverage of tubular solution cavities on surface 176.9-177.6' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), <10% noticeable fossils, <10% coverage of voids 1/16" or less 177.6-181.0' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, very weak to weak (R1 to R2), silty matrix, 5-10% coverage of 3/8" or less solution cavities 181.0-183.5' - Same as 177.6-181.0' except dark brown silty organic laminae (1-3/16" thick)	SC-19 collected at 178.95-180.0'	
			2	176.1-176.3' - Bedding plane, 0-3 deg, rough, planar, recrystallized carbonate on plane		R21: 10 minutes	
			2	176.8' - Fracture, horizontal, rough, stepped, enlarged solution cavity fractures at depositional contact			
			1	177.45' - Fracture, horizontal, smooth, planar			
			3	177.95, 178.3, 178.5' - Fractures (3), horizontal, rough, planar, lithology contact, <1/16" thick very fine sandy infill			
181.0			4	180.1, 180.4, 180.6' - Fractures (3), horizontal, rough, planar, <1/8" thick carbonate recrystallization infilling			
			0	181.1' - Fracture, horizontal, smooth, planar		SC-20 collected at 181.8-182.95'	
			2	181.5, 181.7, 181.7' - Fractures (3), horizontal, planar, smooth to rough, trace infilling			
185 -142.7	R22-HQ 5 ft 100%	45	4	183.2' - Fracture, horizontal, rough, planar, trace silty infilling		R22: 8 minutes	
			4	183.5, 185.3, 185.4, 185.7, 185.8, 185.9' - Bedding plane (6), 5 deg			
			5	184.2, 184.5' - Fractures (2), horizontal, rough, undulating			
186.0			5	186.1-186.3' - Fracture zone, horizontal, smooth, planar			
			1	186.6' - Fracture, horizontal, rough, planar, lithology contact			
			2	186.9' - Fracture, 10 deg, rough, undulating			
			1	187.8' - Fracture, 8 deg, rough, undulating, silty infilling from formation matrix	SC-21 collected at 188.6-189.8'		
190 -147.7	R23-HQ 5 ft 100%	66	3	188.3, 188.7, 189.9' - Fractures (3), horizontal, rough, planar, trace silty infilling	R23: 18 minutes		
			>10	190.5, 190.7, 190.9' - Fractures (3), 5-40 deg, trace silty infilling			
			>10	191.0-192.4' - Bedding plane, 0-10 deg, smooth, planar to undulating, numerous partings, irregular			
			>10	192.4-195.05' - Fracture zone, 0-90 deg, rough, multiple fracture zones, irregular, may exhibit recrystallization on the surface			
			>10		Numerous rock fragments indicate possible cavity filling debris from at least 195.5-196.0' but probably 193.4-196.0'		
195 -152.7	R24-HQ 5 ft 100%	13	4	195.05, 195.2' - Fractures (2), horizontal and 7 deg, smooth, planar	R24: 6 minutes		
196.0							



PROJECT NUMBER: 338884.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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
200 -157.7	R25-HQ 5 ft 70%	10	5	195.6, 195.8' - Fractures (2), horizontal and 15 deg, rough, undulating		Limestone 183.5-185.0' - very pale orange, (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 40-50% fossil shells, casts and molds up to 1"x 9/16", 20-40% coverage of voids 1/16" or less 185.0-186.0' - very fine to medium grained, very strong HCl reaction, 15-20% coverage of voids 1/16" or less 186.0-191.0' - pale yellowish brown, (10YR 6/2), mild to moderate HCl reaction, very weak to weak (R1 to R2), 10-30% fossil casts and molds, 5-10% coverage of solution cavities 3/8" or less, 30-50% coverage of voids 1/16" or less, 189.0-190.0 alternating dark brown and pale yellow brown laminae 191.0-192.4' - pale yellowish brown, (10YR 6/2), very fine to medium grained, moderate to strong HCl reaction, laminar to thin bedded, 10-20% coverage of solution cavities 3/8" or less 192.4-193.4' - very pale orange, (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 20-30% coverage of voids 1/16" or less, 20-40% fossil casts and molds 193.4-196.0' - pale yellowish brown, (10YR 6/2), very fine to coarse grained, strong HCl reaction, slightly mottled, light to moderately dense rock, 10-15% coverage of voids 1/16" or less, abundant fossils, indistinct bedding, multiple lithologic fragments 196.0-198.0' - grayish orange, (10YR 7/4), medium to coarse grained, moderate HCl reaction, very weak (R1), 30-40% fossils, 10-20% coverage of solution cavities 3/8" or less 198.0-198.5' - alternating grayish orange and light brown, (10YR 7/4 to 5YR 5/6), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), medium to coarse grained at alternating laminae 198.5-199.5' - strong HCl reaction, extremely weak (R0), large amount of non carbonate silt to clay-sized particles, 10% coverage of voids 1/16" or less, pyrite grains on and define laminar silt beds No Recovery 199.5-201.0'	R25: 9 minutes Widely disseminated oxidized pyrite grains The unit appears as random clast orientations in variably hard matrix, it is either fluvial or infill of an undetermined void, it exhibits very low density and apparent strength R26: 7 minutes R27: 11 minutes Stop drilling 17:28 3/7/07 Water level 2.5' below ground surface Resume drilling 08:50 3/8/07 R28: 23 minutes	
			4	196.0-196.3' - Fracture zone, random orientations, fragments 1/4" to 3/4"				
			5	196.6' - Fracture, 30-50 deg, rough, planar				
			>10	197.3, 197.4' - Fractures (2), horizontal, rough, planar, solution cavity fractures				
			NR	198.05, 198.1, 198.4, 198.5' - Fractures (4), 0-7 deg, smooth, planar				
201.0				198.6' - Fracture, horizontal, smooth, planar, lithology contact				
				199.0-199.5' - Fracture zone, orientations are random, rock fragments range from 1/8"x1/2" to 2"x1"x1 1/2"				
			>10	201.0-201.5' - Fracture zone, random orientation				
			5	201.5-202.1' - Fracture zone, 25-90 deg, rough, non separated fracture, indistinctly extends into underlying unit				
205 -162.7	R26-HQ 5 ft 80%	36	5	201.5' - Fracture, 10 deg, rough, planar				
			>10	202.1' - Fracture, horizontal, rough, stepped, lithology contact				
			NR	202.7-203.0' - Fracture zone, multiple fracture orientation				
				203.1-203.3' - Fracture zone, multiple fractures broken along fragment edges				
				203.7' - Fracture, 2 deg, rough, planar				
210 -167.7	R27-HQ 5 ft 50%	10	4	206.2, 206.3, 201.7, 206.9' - Fractures (4), 0-10 deg, smooth, planar				
			>10	207.0-208.5' - Fracture zone, 75-80 deg, multiple fractures 207.5-208.0, fragments up to 2 1/2"x1 to 1/4"x1/2"				
			>10					
			NR					
215 -172.7	R28-HQ 5 ft 40%	0	>10	211.0-213.0' - Fracture zone, no distinguishable orientation				
			>10					
			NR					
216.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-07	SHEET 12 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.7	R29-HQ 5 ft 34%	0	NR		<p>Limestone 201.0-202.1' - grayish orange, (10YR 7/4), strong HCl reaction, weak to medium strong (R2 to R3), carbonate derived silt-sized grains 202.1-205.0' - pale yellowish brown, (10YR 6/2), mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), 10-20% sand-sized matrix, 5-15% fossils, 30-40% coverage of voids 3/16" or less No Recovery 205.0-206.0</p> <p>Limestone 206.0-207.0' - grayish orange, (10YR 7/4), strong HCl reaction, very weak (R1), thin to laminar bedding, very low density, no visible fossils, 5-15% coverage of voids 1/16" or less, no solution cavities 207.0-208.5' - dark yellowish orange to grayish orange, (10YR 6/6 to 10YR 7/4), moderate to strong HCl reaction, 10-20% coverage of voids 1/8" or less, slightly friable, worm burrows in very fine grained limestone 207.2-208.0' No Recovery 208.5-211.0'</p> <p>Limestone 211.0-213.0' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, very weak to weak (R1 to R2), 30-40% fossil shell fragments, casts, and molds, 20-40% coverage of voids 1/6" or less, 5-10% coverage of solution cavities 3/8" or less, low to moderate density No Recovery 213.0-216.0'</p> <p>Limestone 216.0-216.4' - pale yellowish brown and grayish orange, (10YR 6/2, 10YR 7/4), fine grained, strong HCl reaction, pale yellowish brown material is weak to medium strong (R2 to R3), non fossiliferous, grayish orange material is very weak to weak (R1 to R2) with 30-40% fossils No Recovery 216.4-219.7'</p> <p>Limestone 219.7-221.0' - grayish orange, (10YR 7/4), strong HCl reaction, very weak to weak (R1 to R2), 40-50% fossils, 20% coverage of voids 3/8" or less, trace organics, abundant fossil casts and molds, low to moderately dense, 15% coverage of 1/16" or less voids</p>	<p>Driller's Remark: Soft and rapid drilling at 216.5-220.0' Assume loss of recovery is 216.4-219.7' based on driller's report of soft and rapid drilling at 216.5-220.0'</p> <p>R29: 8 minutes</p>	
225 -182.7	R30-HQ 5 ft 30%	0	NR		<p>221.0-222.5' - Fracture zone, 2-3 of the fractures are smooth and planar bedding plane partings</p>	<p>Driller's Remark: Drilling action intermittently becomes hard and soft The final 0.5' recovered is an agglomeration, appears to have 60-80 deg planar features that may indicate subsidence infill</p> <p>R30: 4 minutes</p>	
230 -187.7	R31-HQ 5 ft 30%	0	NR		<p>226.0-227.5' - Fracture zone, multiple fractures, no visible orientations</p>	<p>R31: 5 minutes</p>	
235 -192.7	R32-HQ 5 ft 12%	0	NR		<p>231.0-231.6' - Fracture zone, random orientations, fragments range from 1/4" to 1"x3/4"</p>	<p>Discuss drilling to 265.0', conclusion continue drilling to 265.0' even though very low recovery and 0% RQD for the last 5 runs (25') in hopes that borehole stays open</p> <p>R32: 8 minutes</p>	
236.0							



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 03/07/07 START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
240 -197.7	R33-HQ 5 ft 40%	22	>10 5 NR	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, 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' 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' 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 partings, bedding ranges from horizontal to 10 degrees, 5-15% coverage of voids 1/16" or less No Recovery 238.0-241.0' Limestone 241.0-242.1' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak 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' 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 HCl reaction, weak to medium strong (R2 to R3), fossiliferous, 5-10% coverage of voids 1/16" or less No Recovery 247.5-251.0'	R33: 4 minutes	
245 -202.7	R34-HQ 5 ft 22%	0	>10 NR	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"		R34: 5 minutes	
250 -207.7	R35-HQ 5 ft 30%	0	>10 4 NR	246.0-247.0' - Fracture zone 247.05, 247.2, 247.35, 247.4' - Bedding plane (4), 0-7 deg		R35: 8 minutes	
255 -212.7	R36-HQ 5 ft 48%	13	>10 >10 2 NR	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 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		R36: 7 minutes	
256.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
260 -217.7	R37-HQ 5 ft 90%	25	7 4 4 >10 >10 NR	256.1, 256.3, 256.4, 256.6, 256.7, 256.8, 256.9' - Fractures (7), horizontal, rough, planar, fractures along laminae 257.15, 157.35, 157.7, 157.9' - Fractures (4), rough, planar, fractures along bedding plane partings 258.1, 258.2, 258.4, 258.75' - Bedding plane (4), 0-10 deg, smooth, undulating 259.1, 259.25, 259.4, 259.5, 260.0' - Fractures (5), horizontal, rough, planar, along laminae 260.0-260.5' - Fracture zone, random orientation, fragments 1"-2" 261.0-263.0' - Fracture zone 261.6, 261.99' - Fractures (2), rough, planar 262.1, 262.3, 262.6, 262.9' - Fractures (4), rough, planar, hard to distinguish	Limestone 251.0-253.4' - pale yellowish brown, (10YR 6/2), very fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), moderately dense, some coarse grained material, 25-40% fossil casts and molds, 30% coverage of voids 1/16" or less, 5-10% solution cavities, moderately friable at both ends of core No Recovery 253.4-256.0' Limestone 256.0-260.5' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), very fine to medium grained, moderate to strong HCl reaction, extremely weak (R0), light to moderately dense, laminar to thin (up to 1" thick) beds that locally contain minor amounts of organic material that grade from very fine moderately dense limestone to very thin very weak laminae with undulating beds, 20-30% fossils, 20-30% coverage of voids 3/16" or less, 5-10% solution cavities, friable, 30-50% silty and sand-sized grain matrix, coarse grained limestone No Recovery 260.5-261.0' Limestone 261.0-263.0' - very pale orange, (10YR 8/2), very fine grained, medium strong (R3), 15-20% coverage of voids 1/16", interbedded with light fossil rich friable intervals, fossil casts and molds abundant in friable interbeds, rock has moderate HCl 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 3/8/2007	R37: 4 minutes	
265 -222.7	R38-HQ 5 ft 40%	8	>10 >10 NR			R38: 7 minutes Removed inner core barrel, driller pulled 10' of outer casing and tagged depth to 266.0', hole stayed open overnight, outer core barrel stayed at 256.0'	
266.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.1	0.0			Poorly Graded Sand With Organics (SP) 0.0-0.3' - dusky brown, (5YR 2/2), moist, very loose, very fine to fine grained, 15% fine grained organics, sand is silica		
	1.0	SS-1	2-2-2-3 (4)	Poorly Graded Sand With Silt (SP-SM) 0.3-1.0' - medium light gray, (N6), moist, very loose, very fine to fine grained, no HCl reaction, 5% nonplastic fines, sand is silica		
	2.0			Poorly Graded Sand With Silt (SP-SM) 2.0-3.4' - moderate brown, (5YR 4/4), wet, loose, very fine to fine grained, no HCl reaction, 10-15% nonplastic fines, sand is silica		
	1.4	SS-2	3-3-2-1 (5)	Clayey Sand (SC) 4.0-4.9' - medium light gray, (N6), moist, soft, very fine to fine grained, no HCl reaction, 35% medium to high plastic fines, trace organics, sand is silica		
	4.0			Silt (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 fine sand-sized, carbonate derived		
5	0.9	SS-3	0-1-2-2 (3)	Silt (ML) 8.0-8.8' - Same as 6.0-7.2' except very soft		
37.1	6.0			Silt (ML) 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% very fine to fine sand-sized		
	1.2	SS-4	3-10-12-13 (22)	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		
	8.0			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		
	0.8	SS-5	16-24-5-3 (29)	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		
10	10.0			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 carbonate		
32.1	0.7	SS-6	0-2-1-12 (3)			
	0.5	SS-7	5-50/5 (55/11")			
	14.0					
	14.5	SS-8	50/6 (50/6")			
15						
27.1	0.1	SS-9	50/3 (50/3")			
	18.0					
	1.9	SS-10	17-28-39-22 (67)			
20						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.1	20.0	1.5	SS-11	10-15-17-16 (32)		
22.0		1.6	SS-12	17-19-49-50/1 (68)		
23.6						
24.0						
24.4	0.4		SS-13	50/5 (50/5")		
25						
17.1	26.0	1.6	SS-14	10-11-7-11 (18)		Sample SS-14 is similar to SS-12 and above, but darker in color
	28.0	0.7	SS-15	8-11-10-50/5 (21)		Chatter at 29.0'
	30.0					
30	30.3	0.0	SS-16	50/4 (50/4")		
12.1						
	32.0	1.5	SS-17	23-36-27-28 (63)		
	34.0	0.6	SS-18	28-50/5 (78/11")		
35	34.9					
7.1	36.9	0.0	SS-19	50/1 (50/1")		Heavy chatter at 36-37'
	38.9	0.0	SS-20	50/0.5 (50/0.5")		
40						



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.1	40.0	1.3	SS-21	24-24-50/3 (74/9")		
	41.3					
	42.0					
	42.5	0.5	SS-22	50/6 (50/6")		
	44.0					
	44.3	0.1	SS-23	50/3 (50/3")		
45 -2.9						
	46.0					
	46.2	0.1	SS-24	50/2 (50/2")		
	48.0					
	48.4	0.3	SS-25	50/5 (50/5")		
	50.0					
	50.9	0.0	SS-26	50/1 (50/1")		
50 -7.9						
	52.0					
		1.7	SS-27	14-25-24-16 (49)		Sample SS-27 and similar samples may be extremely weak limestone
	54.0					
	54.3	0.2	SS-28	50/4 (50/4")		
55 -12.9						
	56.9	0.0	SS-29	50/1 (50/1")		Stopped drilling for the day 3/12/07 at 17:50, at 56' Surface collapse 3/13/07 at 07:45, driller rebuilding surface with dirt; will insert HW casing HW casing set to 14' at 09:40 Resume drilling at 10:15 on 3/13/07
	58.0					
	58.6	0.4	SS-30	24-50/1 (74/7")		
60						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-17.9	60.0	0.5	SS-31	27-50/1 (77/7")	Silty Sand With Gravel (SM) 60.0-60.5' - Same as 58.0-58.4' except 20% fine to coarse sand-size, 30-35% gravel-size limestone fragments in wafer shapes		
	60.6						
	62.0						
	62.3	0.2	SS-32	50/3 (50/3")	Limestone Fragments 62.0-62.2' - dark yellowish brown, (10YR 4/2), mild HCl reaction, 1/4" thick wafer shaped limestone fragments		
	64.0						
	64.4	0.2	SS-33	50/5 (50/5")	Limestone Fragments 64.0-64.2' - Same as 62.0-62.2'		64-64.7' heavy chatter
65							
-22.9	66.0						
	66.3	0.3	SS-34	50/5 (50/5")	Silty Sand (SM) 66.0-66.3' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, fine to coarse grained, mild HCl reaction, 30-35% nonplastic fines, 20% fine size, all carbonate Begin Rock Coring at 66.0 ft bgs See the next sheet for the rock core log		65.7-66' no chatter, softer
70							
-27.9							
75							
-32.9							
80							



PROJECT NUMBER: 338884.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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
66.0	R1-HQ 5 ft 92%	65	<10	66.0-66.2' - Fracture zone 66.3' - Fracture, horizontal, smooth, planar, open 66.8-67.0' - Fracture, 50-55 deg, rough, planar, tight 67.2' - Mechanical break 67.3-67.9' - Fracture, 10-50 deg, rough, planar, tight 68.2' - Fracture, 10 deg, rough, planar, open 68.4-68.55' - Mechanical break, 30 deg, smooth, planar, open <1/16" 68.95-69.0' - Fracture, 30 deg, smooth, planar, silt and/or clay sized infilling, <3/16" thick, open 69.4, 69.5' - Fractures (2), horizontal, smooth, planar, silt infilling, open	Limestone 66.0-70.6' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, mild HCl reaction, very weak to weak (R1 to R2), <1/16" voids on 15-20% of surface	Geophysical testing performed prior to rock coring, depth tagged at 65.5'	
70			3				
-27.9			1				
			3				
			0				
			NR				
71.0	R2-HQ 5 ft 96%	73	0	70.5' - Fracture, horizontal, smooth, undulating, open 71.4' - Fracture, 20 deg, rough, undulating, trace red laminated staining, open 72.35' - Fracture, horizontal, rough, planar 72.75, 72.9' - Fractures (2), 30 deg, rough, planar, tight 73.0' - Fracture, horizontal, rough, stepped, trace silt and/or clay infilling 73.3-73.6' - Fracture, 80 deg, rough, undulating, tight 73.6' - Fracture, horizontal, rough, undulating, tight 73.6-74.25' - Fracture, 60 deg, rough, undulating, tight 75.3, 75.5' - Fractures (2), horizontal, rough, stepped, <3/16" silt infilling, open 1/8" 75.5-75.8' - Fracture, 75 deg, rough, undulating, tight 76.0-76.05' - Clay seam, dark organic rich clay 76.05-76.6' - Fracture zone 76.8-76.9' - Mechanical break or fracture, 15 deg, rough, undulating, open 77.7' - Fractures, multiple vertical fractures 77.8-78.2' - Fracture, 75 deg, smooth, undulating, tight 77.8-78.2' - Fracture, rough, planar, orthogonal to above, tight 78.2-78.9' - Fracture, vertical, rough, undulating, trace black powdery staining, tight 78.9-79.2' - Bedding plane, horizontal, smooth, undulating, 1/4"-1/2" thick, open 1/8" 81.7' - Fracture, 15 deg, rough, planar, <1/16" thick silt or/and clay sized infilling, 1/4" open 82.4' - Fracture, 15 deg, rough, undulating, open 83.3, 83.6, 84.3' - Fractures (3), horizontal, rough, planar, silt and/or clay sized infilling, open 83.6-83.7' - Fracture zone 84.8' - Mechanical break	No Recovery 70.6-71.0' Limestone 71.0-75.2' - Same as 66.0-70.6' except 5-10% solution cavities up to 3/8" at 72.6-75.2', weak to medium strong (R2 to R3) at 74.0-75.0' 75.2-75.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), trace voids to 1/8", trace casts/ cavities up to 3/8"x9/16" No Recovery 75.8-76.0' Limestone 76.0-78.9' - light gray to very pale orange, (N7 to 10YR 7/2), very fine to fine grained, moderate HCl reaction, weak (R2), trace voids to 1/16", trace casts/cavities to 3/4"x3/8" Clay (CL) 78.9-79.2' - grayish brown, (5YR 3/2), mild HCl reaction, organic, laminated No Recovery 79.2-81.0'	SC-1 collected at 69.4-70.5' R1: 8 minutes SC-2 collected at 71.4-72.85' R2: 7 minutes SC-3 collected at 76.9-77.8' R3: 8 minutes	
75			2				
-32.9			0				
			3				
			7				
			NR				
76.0	R3-HQ 5 ft 64%	23	>10		Limestone 81.0-83.3' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 15% voids <1/16", 5-10% solution cavities up to 3/8", 10-15% fine sand with limestone, weak (R2), same color, 20-25% voids 83.3-83.6' - transition zone as rock from 81.0-83.3' grades into material at 83.6-86.4'	SC-4 collected at 82.4-83.3'	
80			3				
-37.9			7				
			NR				
			NR				
			NR				
81.0	R4-HQ 5 ft 100%	88	1		Limestone 81.0-83.3' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 15% voids <1/16", 5-10% solution cavities up to 3/8", 10-15% fine sand with limestone, weak (R2), same color, 20-25% voids 83.3-83.6' - transition zone as rock from 81.0-83.3' grades into material at 83.6-86.4'	R4: 7 minutes	
85			1				
-42.9			3				
			1				
			0				
86.0							



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
90 -47.9 91.0	R5-HQ 5 ft 100%	71	0	86.2' - Fracture, 10 deg, rough, undulating, open	[Symbolic Log Pattern]	Limestone 83.6-86.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak (R2), 20-25% coverage 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 3/4"x3/8") throughout, single large (2-3/4"x3/4") cavity at 86.0' 86.4-91.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), fossil casts and molds, 3/16" voids on 15% of surface, 10% solution cavities up to 3-1/8"x3/4" 91.0-92.9' - moderate yellowish brown mottled very pale orange, (10YR 5/4 mottled 10YR 6/2), fine grained, moderate HCl reaction, very weak to weak (R1 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, extremely weak (R0) material 92.9-96.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 5% voids, 2-5% solution cavities 96.0-101.0' - very pale orange to 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" diameter, 10% irregular black laminae/inclusions at 96.5-97.5'	SC-5 collected at 88.6-89.5' R5: 7 minutes SC-6 collected at 94.0-94.9' R6: 15 minutes SC-7 collected at 98.15-98.9' R7: 6 minutes
			4	87.35' - Fracture, horizontal, smooth, undulating, 1/4" hard infill, tight			
			2	87.6' - Fracture, horizontal, smooth, undulating, silt and/or clay sized infilling, 1" thick infilling, tight			
			1	87.75' - Fracture, horizontal, smooth, undulating, 1/2" silt infill, tight to 1/2" open			
			1	88.0' - Fracture, horizontal, smooth, undulating, silt and/or clay sized infilling, tight, 1/2" silt infill, 1/4" open			
			0	88.35' - Fracture, horizontal, smooth, stepped, tight			
			1	88.6' - Fracture, horizontal, smooth, undulating, 1/8"-1/2" open			
			1	89.8' - Mechanical break			
			3	90.5' - Fracture, 2-4 deg, smooth, undulating, tight			
			2	92.6' - Fracture, 5-7 deg, rough, planar, <3/8" thick infilling, carbonate silt, open			
95 -52.9 96.0	R6-HQ 5 ft 100%	93	2	93.0' - Fracture or mechanical break, horizontal, rough, undulating, white infilling 1/16" thick, tight	[Symbolic Log Pattern]	92.9-96.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 5% voids, 2-5% solution cavities 96.0-101.0' - very pale orange to 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" diameter, 10% irregular black laminae/inclusions at 96.5-97.5'	SC-6 collected at 94.0-94.9' R6: 15 minutes SC-7 collected at 98.15-98.9' R7: 6 minutes
			2	93.2, 93.6' - Mechanical break (2)			
			2	94.0, 94.9' - Fractures (2), horizontal, rough, undulating, open			
			2	95.2' - Fracture, horizontal, smooth, planar, dark brown clay infilling 3/4" thick			
			3	95.9-96.0' - Fracture or mechanical break, 30 deg, rough, planar, tight			
			1	96.25-96.35' - Fracture, 45 deg, rough, planar, open			
			1	96.95' - Fracture, horizontal, smooth, planar, fractured along contact			
			2	97.05' - Fracture, horizontal, rough, planar, tight			
			2	97.4, 97.6, 98.9' - Fractures (3), 0-5 deg, rough, undulating, up to 1/8" open			
			2	99.3' - Mechanical break			
100 -57.9 101.0	R7-HQ 5 ft 100%	58	2	99.6' - Fracture, 0-30 deg, rough, undulating, tight	[Symbolic Log Pattern]	92.9-96.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 5% voids, 2-5% solution cavities 96.0-101.0' - very pale orange to 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" diameter, 10% irregular black laminae/inclusions at 96.5-97.5'	SC-7 collected at 98.15-98.9' R7: 6 minutes
			2	100.0' - Mechanical break			
			NA	100.5-101.05' - Fracture, 70 deg, rough, undulating, open 1/8"-1/4"			
			1	101.4' - Fracture, 30 deg, rough, undulating, sand/rock contact			
			3	102.25' - Fracture, horizontal, rough, planar, tight			
			2	102.8' - Fracture, 10 deg, rough, undulating, open			
			2	102.85-103.05' - Fracture, 60 deg, rough, undulating			
			>10	103.95' - Fracture, 20-25 deg, rough, planar, open			
			>10	103.95-104.2' - Fractures (3), rough, undulating, open			
			>10	104.5' - Mechanical break			
105 -62.9 106.0	R8-HQ 5 ft 100%	46	1	104.5' - Mechanical break	[Symbolic Log Pattern]	Poorly Graded Sand (SP) 101.0-101.4' - grayish orange, (10YR 7/4), very fine to fine grained, strong HCl reaction, 80% carbonate, 20% silicate Limestone 101.4-106.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace voids up to 1/16", no visible casts/cavities	SC-8 collected at 103.05-103.95' R8: 10 minutes
			3	102.25' - Fracture, horizontal, rough, planar, tight			
			2	102.8' - Fracture, 10 deg, rough, undulating, open			
			>10	103.95' - Fracture, 20-25 deg, rough, planar, open			
			>10	103.95-104.2' - Fractures (3), rough, undulating, open			
			>10	104.5' - Mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 7 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
110 -67.9	R9-HQ 5 ft 100%	66	3	104.65-105.0' - Fracture zone undulating, open		Limestone 106.0-111.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), 20% voids up to 1/16" on surface, casts/cavities up to 1-9/16" on 10% of surface	SC-9 collected at 110.0-111.0'	
			3	105.45-106.0' - Fracture zone undulating, 1/4" open				
			2	106.0-106.1' - Fracture, vertical, rough, undulating, 1/4" open				
			3	106.1, 106.3' - Fractures (2), vertical, smooth, planar, open				
			3	107.3, 107.5' - Fractures (2), horizontal, smooth, planar, <3/16" open				
			0	107.9, 108.25-108.3' - Fractures (3), 30 deg, smooth, undulating, tight				
			0	109.0' - Fracture, horizontal, rough, undulating, open			R9: 6 minutes	
			2	109.45' - Fracture, horizontal, smooth, undulating, 1/8" open				
			0	109.6' - Fracture, 10 deg, rough, stepped, 1/8" open				
			3	109.7' - Fracture, 10 deg, rough, undulating, open			SC-10 collected at 113.65-114.55'	
115 -72.9	R10-HQ 5 ft 100%	90	1	110.0' - Fracture, horizontal, rough, undulating			Driller's Remark: Lost circulation at 115'	
			1	110.0' - Fracture, horizontal, rough, undulating			R10: 8 minutes	
			3	111.3' - Mechanical break, horizontal				
			1	111.65-111.85' - Fracture, 45 deg, rough, planar, tight				
			1	113.2' - Fracture, horizontal, rough, stepped, 1/8" open				
			1	113.4' - Mechanical break				
			4	113.65, 114.55' - Fractures (2), horizontal, rough, undulating				
120 -77.9	R11-HQ 5 ft 100%	33	4	115.5' - Fracture, horizontal, smooth, undulating, open		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	SC-11 collected at 120.2-121.0'	
			7	116.1, 116.25' - Mechanical break (2)				
			3	116.25-116.8' - Fractures (2), 75 deg, rough, undulating, 10% black stain, open				
			4	116.8' - Fracture, 30 deg, rough, undulating, open				
			1	117.1-117.2' - Fracture, 52 deg, rough, planar, 1/8" open				
			1	117.35' - Fracture, horizontal, rough, planar				
			1	117.65-117.9' - Fracture, rough, planar, 1/8" open				
			1	117.9-118.2' - Fracture zone			R11: No runtime recorded	
			5	118.8, 119.5, 119.3' - Fractures (3), 10 deg, smooth, undulating, tight				
			3	118.9' - Fracture, 20 deg, rough, undulating, tight				
125 -82.9	R12-HQ 5 ft 100%	34	2	121.0-122.65' - Same as 116.0-121.0' except trace cavities up to 9/16"x3/16"			SC-12 collected at 123.7-124.5'	
			2	122.65-126.0' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, very weak (R1), trace voids to 1/16", 25-30% casts up to 3/8"x3/4" at 122.65-123.7', highly fossiliferous				
			2	121.0-122.65' - Same as 116.0-121.0' except trace cavities up to 9/16"x3/16"				
			2	121.0-122.65' - Same as 116.0-121.0' except trace cavities up to 9/16"x3/16"				
			>10	121.7' - Bedding plane, horizontal, smooth, planar, <1/8" open			R12: 5 minutes	
			>10	121.95' - Fracture or bedding plane, horizontal, smooth, planar, <1/8" open				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY		COMMENTS
				DESCRIPTION			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.	
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
130 -87.9	R13-HQ 5 ft 70%	0	0	>10	122.25-122.6' - Fracture, 60 deg, rough, stepped, tight		Limestone 126.0-129.5' - fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 3-5% of surface, trace fossils (molds/casts), rare intraclasts	R13: 6 minutes	
				10	122.6-122.7' - Fracture, 25 deg, rough, undulating				
131.0	R13-HQ 5 ft 70%	0	0	10	123.3-123.6' - Fracture, 75 deg, rough, undulating, tight		No Recovery 129.5-131.0'	R13: 6 minutes	
				10	124.5' - Fracture, 35 deg, smooth, planar				
				10	124.8-126.0' - Fracture zone				
				10	126.0-127.0' - Fracture zone, 0-60 deg, rough, undulating to stepped, open				
135 -92.9	R14-HQ 5 ft 56%	15	15	NR	127.0, 127.25' - Fractures (2), <5 deg, rough, stepped, open		No Recovery 129.5-131.0'	R14: 4 minutes	
					127.45' - Fracture, 60 deg, smooth, undulating, open				
					127.7-128.0' - Fracture, 60-90 deg, smooth, stepped, tight, vertical from 128.0' to 128.3'				
136.0	R14-HQ 5 ft 56%	15	15	10	128.3' - Fracture, horizontal, rough, stepped, open		Limestone 131.0-131.5' - pale yellowish brown, (10YR 6/2), medium to coarse grained, strong HCl reaction, very weak (R1), 50-60% voids up to 3/8", fossils (molds/casts) common	R14: 4 minutes	
				5	128.75' - Fracture, 60 deg, rough, stepped, open				
				>10	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, stepped, open				
					131.45-131.65' - Fracture zone, various orientations, rounded gravelly limestone				
				NR	131.65-132.0' - Fracture, <5-90 deg, rough, undulating, open				
					132.0-132.3' - Fracture zone, 60 deg, rough, stepped, intersected by 40 deg inclined fracture, tight				
140 -97.9	R15-HQ 5 ft 76%	0	0	>10	132.5' - Mechanical break		Limestone 136.0-137.3' - pale yellowish brown alternating with very pale orange laminae, (10YR 6/2) alternating with 10YR 8/2), fine grained, weak to medium strong (R2 to R3), 15-20% silty matrix, voids <1/16" on 10-15% of core surface, trace fossils (echinoderms)	R15: 5 minutes	
				>10	132.75-133.0' - Fracture, 70 deg, rough, undulating, tight				
				>10	133.0-133.2' - Fractures (2), vertical, rough, undulating, vertical and horizontal intersecting fractures				
				>10	133.25, 133.35, 133.4' - Bedding plane (3), horizontal, smooth, open				
				NR	133.4-133.6' - Fracture zone, various orientations, gravel sized limestone rock fragments, angular				
				NR	136.0-139.8' - Fracture zone, multiple fractures ranging from horizontal to vertical, stepped to undulating, rough, tight to open				
141.0	R15-HQ 5 ft 76%	0	0	5	141.0-141.1' - Fracture zone, various orientations, producing limestone rock fragments		No Recovery 139.8-141.0'	R15: 5 minutes	
				1	141.5, 142.8, 143.4' - Fractures (3), horizontal, rough, undulating				
				5					
				>10	143.7-143.9' - Fracture zone, 0-90 deg, rough, undulating to stepped				
				10	144.0' - Fracture, <5 deg, rough, open				
145 -102.9	R16-HQ 5 ft 100%	48	48	>10	144.3' - Fracture, <5 deg, rough, stepped, open		Limestone 141.0-143.8' - light gray, (N7), fine to very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), 5-10% voids <1/16", 15-20% solution cavities up to 1-3/6" heavily bioturbated especially in upper section, fossil casts/molds common	R16: 16 minutes	
				10	143.8-145.0' - fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), brecciated appearance, fossils rare to absent, 1-2% voids to <1/16", occasional thin black organic laminae				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
150 -107.9	R17-HQ 5 ft 100%	90	2	144.3-145.2' - Fracture zone, rough to smooth, various orientations, open to tight, limestone rock fragments	|	Limestone 145.0-146.0' - dark yellowish brown, (10YR 4/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), laminated bedding alternating between pale yellowish brown (10YR 6/2) and dark yellowish brown (10YR 6/6), incipient hairline fractures throughout length of interval 146.0-151.0' - mottled yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), fine to very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly laminated to massive bedded, rare solution cavities, 5-10% voids up to 1/16", rare macro fossils 151.0-153.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to medium strong (R1 to R3), voids (1/16") over 3-5% of surface, trace cavities, trace fossil casts becoming thinly laminated with depth, some mottling 153.3-153.8' - Same as 151.0-153.5' except with cavities and voids on 20-25% of surface, few thin laminae 153.8-156.0' - mottled yellowish gray to yellowish gray, (5Y 7/2 to 5Y 8/1), fine grained, strong HCl reaction, very weak to weak (R1 to R2), thinly laminated, numerous bedding plane separations in upper 1/3 of interval, becoming chalk-like with depth, fossils rare to absent 156.0-161.0' - very pale orange to grayish orange, (10YR 7/4 to 10YR 8/2), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), 10-15% fossil shells/casts decreasing with depth, voids (1/16") over 1-3% of surface, rare cavities, occasionally thinly laminated, chalk-like texture at 158.4-158.8' 161.0-165.7' - Same as 156.0-161.0' except voids up to 30-40% on upper 1' of interval, voids becoming less dense with depth, massive bedding with thin laminae near base	SC-14 collected at 146.8-147.9'		
			0	145.2' - Bedding plane, horizontal, smooth, open					
			1	145.4' - Fracture, <5 deg, smooth, undulating, tight, black crystalline-like grains over 10-15% of surface					
			0	146.1' - Fracture, <5 deg, rough, stepped to undulating, open					
			1	146.35' - Fracture, 10 deg and vertical, rough, planar, tight					
	155 -112.9	R18-HQ 5 ft 100%	80	1				148.3' - Fracture or mechanical break, horizontal, rough, undulating	R17: 5 minutes
				2				150.6' - Fracture, horizontal, rough, planar, tight	
				>10				151.0-152.3' - Fracture, vertical, rough, undulating, tight, tiny black crystalline-like grains	
				>10				152.74' - Fracture, <10 deg, rough, stepped, black tiny crystals over 2% of surface, open	
				1				153.3, 153.6' - Fractures (2), <10-40 deg, rough, planar to stepped, open	
160 -117.9	R19-HQ 5 ft 100%	100	1	153.7-154.1' - Fracture zone, stepped to planar, horizontal to slightly inclined, bedding laminae, open	SC-15 collected at 155.05-156.0'				
			0	154.25' - Fracture, 20 deg, smooth, undulating, tight					
			1	154.64' - Fracture, horizontal, rough, stepped, tight					
			1	155.05' - Fracture, horizontal, rough, planar, open, silty infilling					
			2	157.8' - Fracture, 5 deg, smooth, planar, tight					
			0	158.4, 158.8' - Fractures (2), 2 deg, rough, stepped, tight					
165 -122.9	R20-HQ 5 ft 94%	68	0	161.7-162.0' - Fracture zone, horizontal and vertical, smooth, planar to undulating, open	R18: 8 minutes				
			3	162.0-162.5' - Fracture, 80 deg and vertical, rough, planar to undulating, open					
			0	162.55-163.0' - Fracture, 70 deg, rough, undulating, open					
			1	164.9' - Fracture, horizontal, smooth, planar, 3/16" thick silt and/or clay sized infilling, open					
			3						
166.0		NR			No Recovery 165.7-166.0'	SC-16 collected at 158.4-150.3'			
						R19: 7 minutes			
						SC-17 collected at 163.85-164.9'			
						R20: 8 minutes			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
170 -127.9	R21-HQ 5 ft 100%	52	3	165.4, 165.72, 165.78' - Bedding plane (3), horizontal, smooth to undulating, rough to loose 166.2, 166.8, 166.9' - Fractures (3), horizontal, smooth, planar, fractured along laminated bedding, open 167.0-168.0' - Fracture zone, horizontal, smooth, planar, fractured along laminated bedding, open 168.1, 168.4, 169.95' - Fractures (3), 1-2 deg, smooth to rough, trace of silt	□	Limestone 166.0-166.8' - very pale orange, (10YR 8/2), very fine grained, strong 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 15-20% of surface 166.8-169.2' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, very weak (R1), 15-20% voids, 1-2% solution cavities up to 3/8", gradational contact with interval below 169.2-171.0' - Same as 166.0-166.8'	SC-18 collected at 168.3-169.65'
175 -132.9	R22-HQ 5 ft 100%	66	1	170.65' - Fracture, 5-10 deg, rough, undulating, trace silt, open 170.8' - Fracture, 1-2 deg, rough, stepped, open 171.25, 171.4, 171.8' - Fracture zone (3), 70 deg, rough, planar, cobble size fragments 172.75' - Fracture, 20 deg, rough, undulating, open 173.05, 173.7' - Fractures (2), horizontal, rough, planar to stepped, open 173.55' - Fracture, <5 deg, smooth, undulating, brown silty clay over 60% of surface 174.0-174.3' - Fracture, 70 deg, planar to undulating, tight 174.3' - Fracture, horizontal, smooth, planar, open 174.6' - Fracture, 70 deg, rough, planar, tight 174.73' - Fracture, horizontal, smooth, planar, tight 175.85' - Fracture, <5 deg, smooth, undulating, clay infilling, silty clay infilling 176.3' - Fracture, <5 deg, rough, undulating 176.6-176.85' - Fracture zone, horizontal, smooth, planar, open 177.03' - Fracture, horizontal, smooth, planar, open 177.45, 177.6' - Fractures (2), horizontal, smooth, planar, open 178.4' - Fracture, <5 deg, rough, stepped, 3/8"-3/4" open 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, smooth, stepped, zone of soft friable rock fragments, inclined to horizontal, clay over 10-15% 179.85' - Fracture, <5 deg, smooth, stepped 180.0-180.3, 180.55-181.6' - Fractures (2), horizontal, smooth, planar 181.5' - Fracture, 70 deg, smooth, planar, tight 181.8, 181.95' - Fractures (2), horizontal, smooth, planar, open 182.1' - Fracture, <5 deg, smooth, stepped, open	□	171.0-173.6' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, strong (R4), voids over 15-20% of surface, up to 3/4"x3/8" cavities 173.6-173.9' - Same as 171.0-173.6 except no voids, no cavities, finely laminated 173.9-177.75' - Same as 171.0-173.6'	R21: 7 minutes End of shift; stop drilling 3/15/07 at 10:00 Bottom of hole tagged at 171' Resume drilling 3/20/07 at 12:22 R. McComb begins logging hole SC-19 collected at 171.45-172.75' R22: 10 minutes
180 -137.9	R23-HQ 5 ft 100%	52	5	177.03' - Fracture, horizontal, smooth, planar, open 177.45, 177.6' - Fractures (2), horizontal, smooth, planar, open 178.4' - Fracture, <5 deg, rough, stepped, 3/8"-3/4" open 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, smooth, stepped, zone of soft friable rock fragments, inclined to horizontal, clay over 10-15% 179.85' - Fracture, <5 deg, smooth, stepped 180.0-180.3, 180.55-181.6' - Fractures (2), horizontal, smooth, planar 181.5' - Fracture, 70 deg, smooth, planar, tight 181.8, 181.95' - Fractures (2), horizontal, smooth, planar, open 182.1' - Fracture, <5 deg, smooth, stepped, open	□	177.75-178.1' - moderate olive brown, (5Y 4/4), fine grained, no to mild HCl reaction, extremely weak (R0), 1/16" voids over 10-15% of surface, 3/8"- 1-3/16" cavities, friable 178.1-179.45' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), up to 1/16" voids over 10-15% of surface, 10-15% 3/8" to 1-3/16" cavities 179.45-180.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids over 1-2% of surface 180.4-184.80' - dusky yellow, (5Y 6/4), fine to very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over 10-15% of surface and increasing to 30-40% of surface below 183.5', thinly laminated at 182.2-182.4', trace voids from 184.65-184.8'	SC-20 collected at 178.65-179.45' R23: 4 minutes
185 -142.9	R24-HQ 5 ft 100%	66	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, smooth, stepped, zone of soft friable rock fragments, inclined to horizontal, clay over 10-15% 179.85' - Fracture, <5 deg, smooth, stepped 180.0-180.3, 180.55-181.6' - Fractures (2), horizontal, smooth, planar 181.5' - Fracture, 70 deg, smooth, planar, tight 181.8, 181.95' - Fractures (2), horizontal, smooth, planar, open 182.1' - Fracture, <5 deg, smooth, stepped, open	□	177.75-178.1' - moderate olive brown, (5Y 4/4), fine grained, no to mild HCl reaction, extremely weak (R0), 1/16" voids over 10-15% of surface, 3/8"- 1-3/16" cavities, friable 178.1-179.45' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), up to 1/16" voids over 10-15% of surface, 10-15% 3/8" to 1-3/16" cavities 179.45-180.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids over 1-2% of surface 180.4-184.80' - dusky yellow, (5Y 6/4), fine to very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over 10-15% of surface and increasing to 30-40% of surface below 183.5', thinly laminated at 182.2-182.4', trace voids from 184.65-184.8'	SC-21 collected at 184.8-185.7' R24: 5 minutes



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 11 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
190 -147.9	R25-HQ 5 ft 100%	56	7	182.5' - Fracture, horizontal, rough, planar, open		Limestone 184.8-186.5' - pale yellowish brown, (10YR 6/2), very fine to fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), fossil cavities up to 1-1/2"x1" over 60% of surface, voids up to 3/16" over 40% of surface 186.5-187.7' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 5-10% voids over surface, trace cavities, trace fossil molds, up to 40-50% voids at 186.7-186.8' and 186.9-187.05' 187.7-187.73' - Same as 186.5-187.7' except 20-30% voids, 10-15% cavities 187.73-187.93' - light olive gray, (5Y 6/1), fine grained, thinly laminated 187.93-190.2' - yellowish gray, (5Y 5/2), fine grained, mild to moderate HCl reaction, weak (R2), voids over 60-70% of surface with discontinuous laminae with less voids 190.2-190.6' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), dark wispy laminae, voids over 40-60% of surface 190.6-193.5' - yellowish gray to dark yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over 50-60% of surface, cavities up to 3/4"x3/8" and up to 1-3/16" deep, voids becoming less common with depth 193.5-196.0' - grayish yellow, (5Y 8/4), fine to very fine grained, mild to moderate HCl reaction, very weak (R1), voids over 20-30% of surface, 3-5% cavities, trace fossils, trace black organics 196.0-199.3' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, very weak (R1), thinly laminated, trace voids filled with dark organic material, voids over 20-30% of surface, rare cavities, trace voids fossils 199.3-201.0' - yellowish gray, (5Y 7/2), fine to very fine grained, very weak (R1), voids on 3-5% of surface, trace black organic material as thin discontinuous laminae	SC-22 collected at 187.0-188.5'	
			4	182.7-183.02' - Fracture zone, horizontal, smooth, planar, open			R25: 9 minutes	
			1	183.3' - Fracture, horizontal, smooth, planar, open to tight				
			4	184.55' - Fracture, <5 deg, rough, undulating, rock fragments with dark brown clay filling				
			1	184.7' - Fracture, horizontal, rough, planar, open				
			1	185.5-185.7' - Fracture zone, <5 deg, rough, undulating, 1-3/16"-2" open				
			3	186.2, 186.35, 186.45' - Fractures (3), 0-<5 deg, rough, open to tight				
			1	186.64' - Fracture, horizontal, smooth, planar, open				
			1	186.78, 186.93, 187.0, 187.35, 187.6, 187.65, 187.7' - Fractures (7), 0 - <5 deg, rough, planar, open, vertical fracture at 187.35-187.6', tight			SC-23 collected at 191.0-191.9'	
			3	187.8' - Fracture, 70 deg, smooth, planar, tight				
			3	189.05' - Fracture, <5 deg, rough, planar, light brown sandy clay infilling, open				
			6	189.6, 189.7' - Fractures (2), horizontal, smooth, planar, open				
			>10	189.9' - Fracture, <5 deg, rough, stepped to undulating	R26: 6 minutes			
			1	190.6' - Fracture, horizontal, rough, stepped to undulating, black organics over 90% of surface				
			1	191.0' - Fracture, horizontal, smooth, planar, black coating over 100% of surface				
			2	191.6-191.9' - Fracture, 80 deg, rough, planar, open	SC-24 collected at 197.5-198.5'			
			2	191.9' - Fracture, <5 deg, rough, open, with stains				
			10	192.3, 192.4, 192.7' - Fractures (3), <5 deg, rough, undulating to stepped, open				
			10	193.25' - Fracture, <10 deg, smooth, planar to stepped, open				
			10	193.25-195.6' - Fracture zone, with low to high angle fractures, rock fragments	R27: 10 minutes			
			10	196.1' - Fracture, <5 deg, rough, stepped, open				
			2	198.5' - Fracture, horizontal, rough, stepped, open				
			3	198.9' - Fracture, <5 deg, rough, stepped, open				
			1	199.3-201.0' - Fracture zone, horizontal, smooth, open, becoming stepped and rough with depth	SC-25 collected at 202.5-203.5'			
			1	201.35' - Fracture, horizontal, rough, stepped, open				
			4	201.95' - Fracture, horizontal, smooth, planar, open				
			2	202.25' - Fracture, horizontal, rough, planar, open				
			2	202.35-202.5' - Fractures (2), horizontal, rough to smooth, stepped, open	R28: 8 minutes			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 12 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
210 -167.9	R29-HQ 5 ft 76%	25	>10 3 2 >10 NR	203.9' - Fracture, horizontal, rough, undulating, open 204.1, 204.25, 204.4, 204.5' - Fractures (4), horizontal, rough, stepped, open 205.5' - Fracture, horizontal, rough, planar, open 205.8' - Fracture, <5 deg, rough, stepped, open 206.0-207.0' - Fracture zone, horizontal and vertical, rough, abundant horizontal to vertical fractures, open 207.3, 207.75, 207.65' - Fractures (3), horizontal, rough, planar 208.25, 208.7' - Fractures (2), horizontal, smooth, planar, open 208.7-209.8' - Fracture zone 211.0-212.3' - Fracture zone	201.0-203.0' - Same as 199.3-201.0' except with void/ cavity zone from 201.3-201.6' covering 20-30% of surface, very thin dark laminae at 201.8' Limestone 203.0-207.65' - dusky yellow to moderate yellow, (5Y 6/4 to 5Y 7/6), fine to medium grained, mild to moderate HCl reaction, very weak to extremely weak (R1 to R0), voids over 100% of surface except rare cavities from 205.1' to 205.5', some cavities are 3/8" to 3/4" deep 207.65-208.8' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, very weak (R1), voids/cavities rare to absent 208.8-209.2' - fine grained, mild HCl reaction, extremely weak (R0) 209.2-209.8' - light gray, (N7), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), only small gravel sized fragments, voids/cavities over 15-20% of surface up to 3/4" - 1-3/16" length, 3/16" deep No Recovery 209.8-211.0' Limestone 211.0-212.3' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, very weak (R1), voids/cavities over 30-40% of surface No Recovery 212.3-216.0' Limestone 216.0-218.45' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), voids/cavities over 20-30% of surface, trace fossils casts interbedded with soft friable limestone at 217.0-218.0' No Recovery 218.45-221.0'	R29: No runtime recorded	
215 -172.9	R30-HQ 5 ft 26%	0	>10 >10 NR	216.0-218.45' - Fracture zone	216.0-218.45' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), voids/cavities over 20-30% of surface, trace fossils casts interbedded with soft friable limestone at 217.0-218.0' No Recovery 218.45-221.0'	R30: 6 minutes	
220 -177.9	R31-HQ 5 ft 49%	13	>10 >10 NR	218.45' - Fracture, horizontal, rough, planar, open	221.0-222.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, very weak (R1), friable along thin laminae, voids/cavities over 10-30% of surface, trace fossils (casts/molds) 222.7-223.5' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids on 1-3% of surface or absent No Recovery 223.5-226.0'	R31: 7 minutes	
225 -182.9	R32-HQ 5 ft 50%	8	>10 >10 NR	221.0-223.5' - Fracture zone 221.7' - Fracture, horizontal, rough, stepped, open 222.1' - Fracture, fractured gravel sized limestone		R32: 4 minutes	
226.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 13 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
230 -187.9	R33-HQ 5 ft 40%	9	>10	226.0-228.0' - Fracture zone, with some discernible fracture planes 226.3' - Fracture, <5 deg, rough, stepped, open >10 226.75, 226.95' - Fractures (2), horizontal, smooth, undulating, open 226.95' - Fracture, zone of rock fragments 227.35' - Fracture, horizontal, smooth, planar, open NR 227.5, 227.60' - Fractures (2), horizontal, rough, planar, open 227.52' - Fracture, zone of rock fragments 227.9' - Fracture, horizontal, smooth, planar, open	Limestone 226.0-228.0' - pale greenish yellow, (10Y 8/2), fine to very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over 10-15% of surface, voids absent from 227.35-227.50' No Recovery 228.0-231.0'	Stop drilling for the day 3/20/07 Resume drilling at 08:40 on 3/21/07 R33: 5 minutes	
235 -192.9	R34-HQ 5 ft 40%	20	3	231.2' - Fracture, <5 deg, rough, undulating, open 231.9' - Fracture, horizontal, rough, stepped, open 3 232.0' - Fracture, 40 deg, rough, undulating, open NR 232.4' - Fracture, <5 deg, rough, undulating, tight 232.65' - Fracture, 25 deg, rough, undulating, tight 232.8' - Fracture, <5 deg, rough, undulating, open 1-3/16"-1-9/16"	Limestone 231.0-233.0' - yellowish gray to pale greenish yellow, (5Y 7/2 to 10Y 8/2), fine grained, mild HCl reaction, very weak to extremely weak (R1 to R0), voids over 90% of rock No Recovery 233.0-236.0'	R34: 5 minutes	
240 -197.9	R35-HQ 5 ft 32%	0	>10	236.0-237.6' - Fracture zone, no bedding/fracture plane apparent, gravel sized limestone fragments up to 1-2" length >10	Limestone 236.0-237.6' - Same as 231.0-233.0' No Recovery 237.6-241.0'	R35: 6 minutes	
245 -202.9	R36-HQ 5 ft 32%	0	>10	241.0-242.6' - Fracture zone, gravel sized rock fragments, fracture plane uncertain NR	Limestone 241.0-242.6' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids over 40% of rock, trace clay, trace fossil casts No Recovery 242.6-246.0'	R36: 8 minutes	
246.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-08	SHEET 14 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
250 -207.9	R37-HQ 5 ft 32%	7	>10 10 NR	246.0-246.8' - Fracture zone, rock fragments 246.8' - Fracture, horizontal, rough, stepped, open 247.1' - Fracture, horizontal, rough, stepped, tight 247.45' - Fracture, horizontal, rough, stepped, open 247.55' - Fracture, horizontal, smooth, planar 251.0-251.7' - Fracture zone, rock fragments 251.7' - Fracture, 60 deg, smooth, planar, open 252.2, 252.45' - Fractures (2), horizontal, rough, planar, open 252.7, 252.75' - Fractures (2), <5 deg, rough, stepped to planar, open 252.95' - Fracture, <5 deg, rough, undulating, tight 253.2' - Fracture, horizontal, smooth, stepped, open 253.6' - Fracture, horizontal, smooth, planar, open 253.75' - Fracture, <5 deg, stepped to planar, open 254.05' - Fracture, <5 deg, smooth, undulating, tight 254.5' - Fracture, horizontal, rough, planar, open 254.55' - Fracture, horizontal, smooth, planar, open 254.95' - Fracture, rough, planar to undulating, tight 255.5' - Fracture, 70 deg, rough, planar, open 255.7' - Fracture, rough, planar, open 256.0-257.8' - Fracture zone, rough, planar, fracture/joints horizontal to subhorizontal 261.0-261.4' - Fracture zone, rock fragments 261.4, 261.5' - Fractures (2), horizontal, smooth, undulating, open 261.6' - Fracture, horizontal, rough, undulating, open 261.8' - Fracture, <5 deg, stepped, sand sized limestone infilling, open 3/4"-13/16" 262.0' - Fracture, <5 deg, rough, undulating, rough 262.3' - Fracture, horizontal, rough, planar, open 262.3-262.6' - Fracture zone, rock fragments 262.65' - Fracture, <5 deg, rough, stepped, open 263.0' - Fracture, <5 deg, smooth, planar, open 263.5' - Fracture, <5 deg, rough, stepped, open	Limestone 246.0-247.6' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, very weak (R1), friable, thin laminae present in upper 0.5' of interval, voids over 10-15% of surface, cavities up to 3/8" rare No Recovery 247.6-251.0' Limestone 251.0-252.4' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, very weak (R1), friable 252.4-253.5' - yellowish gray, (5Y 7/2), very weak to weak (R1 to R2), very thinly laminated with lenses up to 1/2", voids over 100% of surface, slightly fossiliferous from 252.4-252.7, cavities up to 3/8" over 10-20% 253.5-256.4' - yellowish gray, (5Y 7/2), fine grained, very weak (R1), voids over 50-75% of surface, cavities over 30% 256.4-257.8' - Same as 253.5-256.4' except laminated, cavities over 50-60% of surface, fossiliferous No Recovery 257.8-261.0' Limestone 261.0-263.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, very weak (R1), voids over 50% of surface, very thinly laminated at 263.3' (black organics), some thin laminae at 261.4- 261.5' No Recovery 263.8-266.0'	R37: 7 minutes		
255 -212.9	R38-HQ 5 ft 100%	45	>10 4 4 3 3			R38: 8 minutes		
260 -217.9	R39-HQ 5 ft 36%	0	>10 10 NR			R39: 6 minutes		
265 -222.9	R40-HQ 5 ft 56%	8	>10 10 2 NR			R40: 6 minutes		
266.0						Bottom of Boring at 266.0 ft bgs on 3/21/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ft bgs on 03/22/07 START : 3/12/2007 END : 3/21/2007 LOGGER : C. Wallestad, R. Gomez, R. McComb, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
							End drilling on 3/21/07, total depth 266'
							Borehole collapsed to 38' overnight; unable to re-open hole Water level at 3.4' below ground surface



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 1 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/13/07 START : 3/13/2007 END : 3/22/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
41.9						Cathead Operator - Matthew Griffin 14:17 Water level at about 2' below ground surface SS-1 (5.0-6.5') totally saturated (wet)
5 36.9	5.0					
	6.5	0.5	SS-1	12-8-12 (20)		Driller's Remarks: Drill time: 4 minutes (6.5-10.0')
10 31.9	10.0					
	11.5	0.7	SS-2	4-3-5 (8)		Driller's Remarks: Hard drilling at 13', continued circulation loss
15 26.9	15.0					
	15.4	0.1	SS-3	50/5 (50/5")		Driller's Remarks: Drill time: 4 minutes (10.0-15.0') 14:37 Driller's Remarks: Will insert 15' of 3" NW casing to seal off hole Driller's Remarks: Now using a 4.5" tricone roller drill bit with NW rod to open up the hole for 10' of 6" diameter casing 15:45 Driller's Remarks: Hole is crooked with 19' NWJ in ground; Adding 10' of 6" surface casing to straighten hole 17:17 End of drilling for the day on 3/13/07 with 20' of 6" in place
	18.5					
		1.5	SS-4	47-36-46 (82)		
20	20.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 2 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/13/07 START : 3/13/2007 END : 3/22/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.9				Sandy Silt With Gravel (ML) 18.5-20.0' - 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'
23.5						Driller's Remarks: Drill time: 20 minutes (20.0-23.5')
25	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, trace fine to medium grained sized brilliant green particles (5G 6/6); 23.75-24.0' limestone fragment, all carbonates		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 drill bit
16.9						Driller's Remarks: Drill time: 19 minutes (25.0-28.5')
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, very fine to medium grained, moderate to strong HCl reaction, 20-30% nonplastic fines, 10-15% gravel-sized, poorly fossiliferous (casts) limestone fragments; trace fine black particles		
30						
11.9						Driller's Remarks: Drill time: 6 minutes (30.0-33.5')
33.5						
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, fragments), trace black inclusions, all carbonate		12:48 Start run from 35.0-38.5' - heavy 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)
35						
6.9						
38.5						
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 particles Begin Rock Coring at 38.5 ft bgs See the next sheet for the rock core log		14:24 Driller's Remarks: Switch to rock coring, end of soil sampling at SS-8; approximately 38.5' below ground surface
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 3 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
40 1.9	R1-NQ 3 ft 87%	54	1	39.5' - Bedding plane, horizontal, rough, undulating, tight	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	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	
			>10	39.6' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
41.5			1	40.2-40.45' - Fracture zone, rock fragments up to 2-1/4"	No Recovery 41.1-41.5' Limestone 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)	Start R2 at 16:11	
			NR	40.75' - Fracture, horizontal, rough, undulating, tight			
45 -3.1	R2-NQ 5 ft 94%	62	2	41.5' - Bedding plane, horizontal, rough, planar, fine infill 1/8", tight	No Recovery 46.2-49.0'	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 Start R3 at 16:27	
			1	42.05, 42.25' - Mechanical break (2)			
			0	42.65' - Fracture, 45 deg, rough, planar, tight			
			>10	44.0' - Fracture, horizontal, smooth, planar, tight			
46.5			1	44.2' - Bedding plane, horizontal, rough, undulating, top of extremely weak rock	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"	R3: 7 minutes	
			NR	44.95' - Bedding plane, horizontal, rough, undulating			
			>10	45.75' - Bedding plane or mechanical break, 5 deg, rough, undulating, tight			
50 -8.1	R3-NQ 5 ft 50%	27	NR	46.5' - Bedding plane, horizontal, smooth, planar, fines on surface, open	51.5-56.5' - light olive gray, (5Y 5/2), strong HCl reaction, extremely weak to medium strong (R0 to R3), voids up to 3/16"x3/16" over 30-40% of surface, poorly fossiliferous (casts molds), organic laminae predominant from 52.7-53.1', 20%-30% fined grain black organic particles	17:40 Driller's Remarks: Bottom of hole 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	
			0	51.2' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
55 -13.1	R4-NQ 5 ft 100%	83	1	51.4' - Bedding plane or mechanical break, horizontal, rough, undulating, open with 1/4" infill of fines	56.4' - Bedding plane, horizontal, rough, undulating, fines on surface	R4: 10 minutes Driller's Remarks: Bottom at 56.3' below ground surface 20' of 6" casing 40' of 3" NW casing	
			>10	52.7' - Bedding plane, horizontal, smooth, undulating, tight			
			0	56.8' - Bedding plane, horizontal, smooth, undulating			
56.5			1	57.0' - Bedding plane, <10 deg, smooth, undulating			
			3				
			3				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
60 -18.1	R5-NQ 5 ft 82%	60	3	57.2' - Bedding plane, horizontal, rough, undulating, base of weakly indurated material		Limestone 56.5-57.95' - light olive gray, (5Y 5/2), strong HCl reaction, extremely weak to weak (R0 to R2), tiny voids up to 3/16"x3/16" covering 30-40% of surface, poorly fossiliferous (cast, molds) contains several inches of rock that can be indented with thumb, sharp bedding plane at 57.95' 57.95-60.6' - light olive gray, (5Y 5/2), strong HCl reaction, weak to medium strong (R2 to R3), tiny (<1/16") voids over 10-15% of surface, trace cavities with secondary mineral infill up to 3/4"x1/2" elliptical shape, entire section mottled, trace black fine to medium particles No Recovery 60.6-62.6' Limestone 62.6-63.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), crumbles under thumb pressure, silt with organic laminations 63.5-64.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), up to 20% of rock has cavities up to 4" long 64.5-66.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 15-20% medium coarse sized grayish black inclusions, grayish staining on surface 66.5-70.5' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, weak to medium strong (R2 to R3), poorly fossiliferous (casts), tiny voids up to 3/16"x3/16" covering 20-30% of surface, trace cavities with secondary mineral infill up to 2-1/2"-3/4", 1" thick carbonate silt layer at 67.5', gradual change from very fine to fine grained, medium to fine grained from 62.3-68.0', 67.3' has black wavy staining No Recovery 70.5-71.5'	3/15/07 09:03 Water Level = 1.15' below ground surface 09:15 Start R5-NQ Driller's Remarks: Maintained full circulation R5: 12 minutes Start R6 at 10:04 Driller's Remarks: Probably loss of core at beginning of run R6: 6 minutes Start run R7-NQ at 10:26 R7: 13 minutes Last core run on 3/15/07 20' of 6" diameter casing 40' of 3" diameter NW casing Bottom hole depth at 71.6' 13:20 3/20/07 Measured water level at 0.2' below ground surface; bottom of hole at 71.5' Driller's Remarks: Soft drilling from 72.5-75.0' 13:45 Start run R8-NQ; 100% circulation loss over core run End run at approximately 14:10 Driller's Remarks: Running in 3rd gear, will mix a denser mud for next run R8: 22 minutes 14:25 Start run	
61.5			1	57.85' - Fracture, horizontal, rough, undulating, open 1/4-1/2"				
			NR	57.95' - Bedding plane, horizontal, smooth, planar, open 1/4"				
			NR	58.65, 59.0, 59.2' - Mechanical break (3)				
			NR	59.65' - Fracture, 45 deg, smooth, undulating, tight				
			3	62.75' - Fracture, horizontal, smooth, undulating, base of weakly indurated section, tight				
65 -23.1	R6-NQ 5 ft 78%	52	4	62.85' - Bedding plane or mechanical break, horizontal, rough, planar				
			1	63.4' - Bedding plane or mechanical break, <10 deg, rough, planar				
			1	63.8' - Bedding plane or mechanical break, horizontal, rough, undulating, black staining, tight to open 1/4"				
			3	64.0' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4-1/2"				
			2	64.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
			1	64.55' - Bedding plane or mechanical break, horizontal, rough, planar, tight				
			1	65.1' - Mechanical break				
			1	65.4' - Bedding plane, horizontal, rough, planar, tight				
70 -28.1	R7-NQ 5 ft 80%	72	0	65.95' - Fracture, 15 deg, rough, undulating, open 1/4"				
			NR	66.6' - Mechanical break				
			NR	66.95' - Fracture, 25 deg, rough, undulating, tight				
			NR	67.7, 67.95' - Fractures or mechanical break (2), horizontal, rough, planar, open 1/4-1/2"				
			NR	69.0' - Bedding plane, horizontal, smooth, planar, 1/4" fine infill				
			2	69.5, 70.1' - Mechanical break (2)				
			>10	72.1' - Fracture or mechanical break, 50 deg, smooth, undulating, tight				
			NR	72.4' - Fracture, 90-80 deg, rough, undulating, gray staining, tight				
			NR	72.75' - Mechanical break or fracture, 70 deg, rough, undulating, open 1/4-3/4"				
75 -33.1	R8-NQ 5 ft 66%	38	NR	74.7' - Bedding plane, <10 deg, bottom of core loss zone				
			2	74.85' - Bedding plane or mechanical break, smooth, planar, tight				
			1	76.2' - Fracture, 70 deg, slickensided, undulating, black staining, tight				
			3	76.55, 76.7' - Bedding plane or mechanical break, horizontal, slickensided, planar, open 1/4-1/8"				
			>10	76.85' - Fracture, 70 deg, rough, undulating, tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 5 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
80 -38.1	R9-NQ 5 ft 94%	63	1	78.0' - Bedding plane, horizontal, sharp contact also showing mottling of rock 78.2-75.5' - Fracture zone, irregular shaped cavities infilled with medium coarse grained infill, infill of medium gray (N5) 79.05' - Bedding plane, horizontal, rough, undulating, open up to 3/4" 80.35' - Bedding plane or mechanical break, rough, undulating, tight, open up to 1/8" 80.8-81.2' - Fracture zone, 1-1/4"-1/4" limestone fragments 81.5-82.2' - Fracture zone		Limestone 71.5-73.0' - yellowish gray to light olive brown, (5Y 2/2 to 5Y 5/6), strong HCl reaction, very weak to medium strong (R1 to R3), elongated voids up to 3/16"x1/16" over 25-30% of surface, very irregular shaped cavities up to 3/4"x1-1/4" filled with carbonate silt bearing medium to coarse grained, gray inclusions or infill, poorly fossiliferous (molds) No Recovery 73.0-74.7' 74.7-76.5' - Same as 71.5-73.0' except very weak (R1) rock and yellowish gray (5Y 7/2) from 74.7-74.85', more dense and more fossiliferous from 74.85-76.5' Limestone 76.5-81.2' - moderate yellowish brown to dusky yellow, (10YR 5/4 to 5Y 6/4), moderate to strong HCl reaction, medium strong (R3), mottled very pale orange (10YR 8/2) and medium gray (N5) over 78.2-78.7', tiny (1/16"x1/16") voids on 25-35% of surface, irregular shaped cavities 15-20% with secondary mineral infill, poorly fossiliferous (molds), trace organics as 1/2" long horizontally aligned inclusions, 10-15 deg bedding plane at 78.0', wavy carbonate silt and organic laminae at 80.0', gray staining from 80.4-81.2' No Recovery 81.2-81.5' Limestone 81.5-86.1' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCl reaction, medium strong (R3), voids up to 3/16"x3/16" over 35-45% of surface, elliptical 1/2"x1/2" shaped cavities, moderately fossiliferous (casts), subangular to subrounded inclusions of yellowish gray (5Y 8/1) carbonate silt clasts from 1/8"-2"x2" No Recovery 86.1-86.5' Limestone 86.5-88.3' - medium olive brown, (5Y 4/4), strong HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/16" over 35-40% of surface; carbonate silts (yellowish gray) at 87.0'; at 87.8' medium olive brown, moderately fossiliferous (casts), black medium grained inclusions No Recovery 88.3-91.0' Limestone 91.0-91.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace voids, trace black wavy laminations (>1/16")	R9: 16 minutes 14:42 End run Driller's Remarks: Soft near bottom of run at 81', will advance 3" NW casing to 80' due to continued circulation loss Assumed core loss from end of run SC 1 collected at 81.6-82.45' Driller's Remarks: Continued circulation loss during 3" NW casing advancement, soft at 81.5-84' R10: 9 minutes 09:12 Start R11-NQ Core loss assumed from 88.1 to 90.8' (2.7 ft core loss) R11: 14 minutes Driller's Remarks: Very hard drilling at 91.0', driller pulled out of hole because he thought the core barrel was not spinning; another core run will be made to get the remaining 1/2 foot The 6" core run will be R12-NQ R12: 3 minutes Start R13 at 09:52 R13: 14 minutes	
85 -43.1	R10-NQ 5 ft 92%	67	0	82.7' - Fracture, 50 deg, rough, undulating, tight, brownish black staining 85.3-85.6' - Fracture zone				
86.5				86.8-87.4' - Fracture zone, yellowish gray carbonate silts and up to 1-1/2" subrounded limestone fragments				
90 -48.1	R11-NQ 4.5 ft 40%	0	NR					
91.0	R12-NQ 0.5 ft 100%	100	1	91.2' - Fracture, vertical, smooth, undulating, black staining, tight (runs from 90.8-91.5')				
95 -53.1	R13-NQ 5 ft 100%	0	3	92.1' - Fracture, horizontal, smooth, stepped, tight 92.35' - Bedding plane, horizontal, smooth, undulating, 1/2" thick organic infill 92.55' - Fracture, 80 deg, rough, undulating, tight 92.85' - Fracture, 70-80 deg, rough, undulating, tight 93.0' - Fracture, 70-80 deg, rough, undulating, tight 93.2' - Bedding plane or mechanical break, horizontal, rough, undulating 93.4, 93.5, 93.6' - Fractures (3), horizontal, rough, undulating, tight 93.5' - Fracture, 60-75 deg, rough, undulating 93.75' - Bedding plane, horizontal, smooth, planar, <1/8" organic infill 94.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
96.5			1					
			1					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS				
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION							
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS							
100 -58.1	R14-NQ 5 ft 100%	100	0	95.1' - Fracture, 40-50 deg, rough, undulating, tight	|	91.5-93.75' - Same as 90.8-91.5' except organic interval 1/2" thick at 92.4' gradational change from 93.45' to 93.75'	R14: 8 minutes Continued circulation loss SC-2 collected at 100.55-101.5'				
			1	95.5' - Fracture, 40-50 deg, rough, undulating, tight							
			1	97.85' - Fracture, 45-55 deg, rough, undulating, tight							
	101.5	R15-NQ 5 ft 100%	53	1				98.9' - Fracture, 55-65 deg, rough, undulating, tight	|	93.75-96.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, medium strong (R3), tiny (1/16"x1/16") voids over 35-40% of surface, up to 25% organic laminations concentrated from 93.8-94.7', highly fossiliferous (shells/casts) up to 1-1/2" fragments, up to 5% medium grained gray (N5) particles	R15: 8 minutes
				2				100.55' - Fracture or mechanical break, rough, undulating, tight			
				1				101.7' - Fracture, 40-50 deg, rough, undulating, tight			
				>10				102.1' - Fracture, 40-50 deg, rough, undulating, tight			
	105 -63.1	R16-NQ 5 ft 100%	93	1				104.35' - Fracture, 40-50 deg, rough, undulating, tight	|	96.5-101.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), highly fossiliferous (molds, casts, fragments), trace organics (soft) up to 1-1/2" square fragments, apparent bedding, fossil fragments up to 1/2", few whole spherical fossils, rock has a chalk like appearance	R16-NQ has similar "chalk like" appearance to R15-NQ, but no apparent bedding
				1				104.8' - Fracture or mechanical break, horizontal, rough, undulating, tight			
				1				105.4-106.5' - Fracture zone			
1				106.7' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to open 1/8"							
1				107.75' - Fracture, 70-80 deg, rough, undulating, tight							
0				106.5-106.5' - Same as 96.5-101.5' except densely bedded							
110 -68.1	R17-NQ 5 ft 98%	97	0	106.5-111.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), tiny spherical voids up to 1/16"x1/16" over up to 15% of surface, poorly fossiliferous (casts), trace cavities up to 1/4"x1/4", medium grained white and gray particles up to 35% in matrix	|	106.5-111.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), tiny spherical voids up to 1/16"x1/16" over up to 15% of surface, poorly fossiliferous (casts), trace cavities up to 1/4"x1/4", medium grained white and gray particles up to 35% in matrix	R16: 10 minutes				
			0	106.5-111.5' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')							
			1	106.5-111.5' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')							
			0	111.4' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight							
			0	111.5-116.4' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')							
			0	111.5-116.4' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')							
			2	114.75' - Fracture or mechanical break, 50-60 deg, rough, undulating, open 1/8-1/4"							
			0	115.0' - Bedding plane or mechanical break, horizontal, slickensided, undulating, open 1/4"							
115 -73.1	R17-NQ 5 ft 98%	97	NR	111.5-116.4' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')	|	111.5-116.4' - Same as 106.5-111.5' except at 114.6-116.4' elongated cavities rimmed with a secondary mineralization infill of the same color as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy bedding 1/4" thick near base (about 116.2')	R17: 6 minutes				
			3	116.65' - Fracture or mechanical break, rough, undulating, open 1/8-1/4"							
			2	117.45' - Fracture or mechanical break, 20-30 deg, rough, undulating, open 1/4"							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 7 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
120 -78.1	R18-NQ 5 ft 100%	82	3	118.55' - Fracture, <10 deg, rough, undulating, tight	|	Limestone 116.5-121.5' - very pale orange (10YR 8/2) from 116.5-119.8' and yellowish gray (5Y 8/1) from 119.8-121.5', fine to medium grained, strong HCl reaction, weak (R2), very fine well rounded grains, moderately to highly fossiliferous (casts, molds), gray staining from 116.5-117.0', trace elliptical cavities (1/2"x1/8") rimmed with opaque secondary mineralization in center, coarse appearance of rock due to micro fossils, rock has a "chalk like" feel	SC 4 collected at 117.5-118.6'	
			3	119.0' - Mechanical break				
			3	119.2' - Fracture or mechanical break, horizontal, rough, planar, tight				
	125 -83.1	R19-NQ 5 ft 96%	43	3				119.35' - Bedding plane or mechanical break, horizontal, rough, planar, open 1/8-1/4"
				1				121.05, 121.2' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/4-1/8"
				1				121.45' - Fracture, 40-50 deg, black staining, tight
				1				121.6' - Fracture or mechanical break, rough, planar, tight
				3				122.2' - Fracture, 30 deg, rough, planar, brownish black staining, open 1/8"
				1				122.5' - Fracture or bedding plane, 20 deg, open 1/8-1/4"
				1				122.55, 123.5' - Fracture (2), horizontal, rough, planar, tight
130 -88.1	R20-NQ 5 ft 96%	53	3	123.9' - Fracture, horizontal, rough, undulating, open 1/8"				
			3	124.2' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"				
			NR	124.55, 124.65' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, open 1/8"				
			2	125.25' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"				
			2	125.55' - Bedding plane or mechanical break, horizontal, smooth, undulating, open 1/8-1/4"				
			>10	125.8, 125.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/8-1/4"				
			2	126.65' - Mechanical break or bedding plane, horizontal, smooth, planar, tight				
			NR	127.2' - Bedding plane, <10 deg, rough, undulating, tight				
			5	127.45' - Bedding plane or mechanical break, horizontal, rough, undulating, brown staining, open 1/2"				
			5	127.95' - Fracture, <10 deg, rough, undulating, open 1/4"				
135 -93.1	R21-NQ 5 ft 100%	63	4	128.15' - Mechanical break or fracture, horizontal, smooth, planar, tight				
			4	128.8' - Bedding plane, horizontal, rough, planar, tight				
			0	129.1, 129.13' - Bedding plane (2), horizontal, rough, planar, tight				
			0	129.65' - Bedding plane, horizontal, rough, planar, open 1/4"				
			0	129.8' - Bedding plane, horizontal, rough, undulating, open 1/2-3/4"				
			0	130.15' - Bedding plane, horizontal, rough, planar, open 1/2-3/4"				
			3	130.15-130.4' - Fracture zone, up to 1/2" core fragments, brownish black staining on fracture surface				
>10	130.75, 130.9' - Bedding plane or mechanical break, rough, undulating, open 1/4-3/8"							
						No Recovery 126.3-126.5' Limestone 126.5-131.3' - yellowish gray (5Y 7/2) from 126.5-129.7' and yellowish gray (5Y 8/1) from 129.7-131.25', strong HCl reaction, weak (R2), moderately to highly fossiliferous (casts, molds, microforams), black staining on rock surface, 15-20% fine grained medium gray (N5) particles, very thinly bedded from 128.5-129.5'	R18: 5 minutes	
						No Recovery 131.3-131.5' Limestone 131.5-134.1' - fine to medium grained, strong HCl reaction, very weak (R1), bedding up to 1/2" thick, 20% fine grained medium gray inclusions	R19: 7 minutes	
						134.1-136.5' - fine to medium grained, strong HCl reaction, very weak (R1), moderately fossiliferous (molds, casts), disconformity at 134.25'; 136.3-136.5' beds dipping at 7 deg, trace voids with calcite infill up to 1/6"x1/16" (white infill color), rock color is alternating, laminated to thinly bedded yellowish gray (5Y 7/2) to light olive gray (5Y 5/2) from 131.5-134.25', then yellowish gray (5Y 7/2) to the end of core run	100% loss of circulation continues	
							R20: 8 minutes	
							Start R21 at 14:42	
							SC-5 collected at 135.70-136.50'	
							R21: 10 minutes	
							Continued circulation loss	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
140 -98.1	R22-NQ 5 ft 90%	57	>10		131.55' - Bedding plane, horizontal, smooth, undulating, tight	|	Limestone 136.5-138.3' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, tiny voids up to 1/16" (spheroidal) over 10% of surface, cavities up to 1/2"x1" elongated and infilled with white minerals and medium gray secondary minerals, up to 15% medium grained, medium gray particles, dipping wavy laminations near 138.0' 138.3-139.6' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, strong (R4), moderately fossiliferous (casts, molds), trace tiny voids, reflective very fine grains inside cavities and on broken surfaces, fossils up to 3/4" 139.6-141.0' - light olive gray, (5Y 5/2), strong HCl reaction, strong (R4), short (about 3/8") discontinuous vertical stress fractures, orange staining, irregular shaped cavities up to 1-1/2" No Recovery 141.0-141.5' Limestone 141.5-144.0' - very light gray, (N8), mild to strong HCl reaction, weak to medium strong (R2 to R3), thinly bedded to laminated, voids up to 1/16" diameter over 10% of surface, with very weak (R1) zones that are fractured, trace cavities up to 1/2" diameter, organic content in very weak zones of rock 143.96-144.0', organic odor 144.0-146.1' - yellowish gray, (5Y 8/1), strong HCl reaction, chalk like/powdery feel, horizontally bedded, white and yellowish gray matrix, texture gradually changes from medium to fine grained downward with depth No Recovery 146.1-146.5' Limestone 146.5-148.6' - yellowish gray, (5Y 1/2), mottled in Hue 5Y colors, thinly bedded 148.6-150.9' - light olive gray, (5Y 5/2), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), powdery/"chalk like" feel over upper interval, dense limestone mottled with gray stains over lower interval, elongated cavity 2" long at 150.0', no infill No Recovery 150.9-151.5'	R22: 12 minutes	
			4		131.75, 131.8' - Bedding plane or mechanical break, horizontal, smooth, planar, tight				
			1		132.15, 132.25, 132.55, 133.1' - Bedding plane or mechanical break (4), horizontal, rough, smooth, planar, tight				
	NR		133.3-133.4' - Fracture zone						
	145 -103.1	R23-NQ 5 ft 92%	82	>10					133.45, 133.65, 133.75, 134.0, 134.1' - Bedding plane or mechanical break (5), horizontal, rough to smooth, planar, tight
				0					136.6, 136.7' - Bedding plane or mechanical break, horizontal, rough, planar, tight
				2					137.2' - Fracture, horizontal, rough, planar, open 1/4"
				0					137.65' - Fracture, horizontal, rough, undulating, open 1/8"
	150 -108.1	R24-NQ 5 ft 88%	68	2					138.3-138.85' - Fracture zone, 1"-1-1/2" subrounded fragments
				0					139.4' - Fracture or mechanical break, horizontal, rough, undulating, tight, (R5)
0					139.6' - Fracture, horizontal, rough, undulating, open 1/2-3/4", orange staining				
NR					140.0' - Fracture, horizontal, rough, undulating, black staining, open 1/8"				
2					140.3' - Fracture or mechanical break, horizontal, rough, planar, open 1/8"				
2					140.4' - Fracture, 20-30 deg, rough, undulating, open 1/4-1/2"				
0					140.9' - Fracture, horizontal, rough, undulating, open 1/2-1"				
>10					141.5-141.65' - Fracture zone, subangular fragments up to 3/4"				
>10					141.85' - Bedding plane or mechanical break, horizontal				
NR					143.85' - Bedding plane or mechanical break, horizontal, rough, planar, open 1/4"				
155 -113.1	R25-NQ 5 ft 80%	73	2		143.95' - Fracture, 60-70 deg, rough, undulating, black staining, open				
			3		146.65, 146.8, 148.4, 148.35' - Bedding plane or mechanical break (4), horizontal, rough, planar, tight				
			1		149' - Mechanical break				
			1		150.1' - Fracture, 80 deg, rough, undulating, tight				
			NR		150.25' - Mechanical break or fracture, horizontal, open 1/4"				
			NR		150.45-150.9' - Fracture zone, 1-1/2" fragments				
			1		151.55, 151.65' - Bedding plane (2), horizontal, rough, undulating, tight, organics on fracture surfaces				
			1		152.75, 152.85' - Fracture (2), horizontal, rough, undulating, open 1/8-1/4"				
			1		152.85' - Fracture, horizontal, rough, undulating, open 1/4"				
			1		154.1' - Bedding plane or mechanical break				
		155.05' - Bedding plane, 7 deg, smooth, planar, open 1/4"							
		156.8' - Bedding plane, horizontal							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
160 -118.1	R26-NQ 5 ft 28%	10	NR	157.8' - Fracture, 70-80 deg, rough, undulating, black staining, tight	Limestone 151.5-155.5' - Same as 148.6-150.9' except thinly bedded to laminated 151.5-152.8' and 154.0-155.0' light olive gray, (5Y 5/2), moderate to strong HCl reaction, organic laminations, gray staining of rock at 152.8', 5-10% cavities up to 3/4" spherical and infilled with white minerals, trace up to 10% shell fragments, black wavy laminae (organic) at base of core, gradually changes texture twice from coarse to fine grained with depth No Recovery 155.5-156.5' Limestone 156.5-157.9' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, weak (R2), tiny spherical voids (micro forams) up to 20-30%, trace of elongated cavities, rimmed with secondary mineralization, up to 10% fine grained orange and black particles No Recovery 157.9-162.7' Carbonate Silty Sand With Gravel (SM) 162.7-163.4' - medium gray to medium dark gray, (N5 to N4), wet, nonplastic, strong HCl reaction, 30-40% very fine to fine black particles, gravel-sized fossil fragments up to 1/2" diameter Limestone Fragments 163.4-164.0' at 166.3', angular limestone fragments Limestone 164.0-166.0' - medium gray to medium dark gray, (N5 to N4), fine grained, strong HCl reaction, weak (R2), bedded limestone, trace voids up to 1/16"x1/16" Limestone 166.0-171.0' - light olive gray, (5Y 5/2), strong HCl reaction, strong (R4), voids up to 1/16"x1/16" spherical cover 15-20% of surface, trace medium gray (N5) inclusions up to 1/2"x1/8" at 166.3', wavy horizontal laminations from 166.0-166.6' 171.0-175.9' - Same as 166.0-171.0' except without wavy bedding No Recovery 175.9-176.0'	Last core run of 3/21/07 80' of 3" NW in hole 20' of 6" casing in hole Driller's Remarks: Expects to be in void space from approximately 158.0' down (possible karst/cavity) Rock has "chalk like" texture R26: 2 minutes 08:16 Begin drilling on 3/22/07- water level 1.5' below ground surface 08:44 Start R27-NQ; bottom of hole at 160.7' Driller's Remarks: Still no circulation Driller's Remarks: Run is 0.5' short, he can feel the loose material from the above void that is apparently lodged at top of run and is not allowing for further advancement R27-NQ is a 4.5' run. Sand is observed around the pulled core; hole tagged bottom at 166.0' Driller's Remarks: Mixes a thick batch of mud R27: 13 minutes Driller's Remarks: Steady drilling through run, continued circulation loss (100%), mix 1/4 bag bentonite to mud tub R28: 5 minutes R29: 10 minutes 100% circulation loss, mix 1/4 bag bentonite to mud tub SC-6 collected at 177.0-178.2'	
165 -123.1	R27-NQ 4.5 ft 73%	7	>10	166.3, 166.4, 166.65' - Bedding plane (3), horizontal, rough, undulating, organic infill 1/16" thick 167.1, 167.5, 167.7, 167.93' - Bedding plane (4), horizontal, smooth, planar, tight 168.98-169.33' - Fracture zone 170.02' - Bedding plane, horizontal, rough, undulating, organic infill 1/16" 170.07-170.4' - Fracture zone, organic laminated rock 170.6' - Fracture, vertical, rough, undulating, tight 170.78' - Bedding plane, horizontal, rough, undulating, tight 170.93' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight 171.27, 171.9' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 172.1' - Fracture, 70-80 deg, rough, undulating, tight 172.32' - Fracture, 70-80 deg, rough, undulating, tight 172.4' - Fracture or mechanical break, horizontal, rough, undulating, tight 172.55' - Bedding plane, <10 deg, rough, planar, open 1/8" 173.08' - Bedding plane, horizontal, rough, undulating, open 1/8" 173.35' - Bedding plane, horizontal, rough, undulating, open 1/8"			
170 -128.1	R28-NQ 5 ft 100%	50	>10				
175 -133.1	R29-NQ 5 ft 98%	42	NR				
	R30-NQ		>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-09	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
180 -138.1	5 ft 84%	40	>10	173.60, 173.65, 173.8' - Bedding plane (3), <10 deg, rough, undulating, organic infill, open 1/8"		Limestone 176.0-180.2' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, weak to medium strong (R2 to R3), trace cavities up to 3/8" elongated, tiny voids up to 1/16" over 10-15% of surface, trace organics as wavy laminations <1/16" thick from 179.0-180.2' No Recovery 180.2-181.0' Limestone 181.0-185.9' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, weak to medium strong (R2 to R3), medium to lightly fossiliferous (molds, casts), tiny voids up to 1/8"x1/8" over 25-35% of surface, trace cavities with medium gray (N5) secondary mineral infill, fossils up to 1/4", wavy laminated bedding 1/16" thick at 187.3', yellowish gray matrix mottling at 183.0' No Recovery 185.9-186.0' Limestone 186.0-190.3' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16"x1/8" over 30-50% of surface, poorly fossiliferous (molds), 10-15% organics as short (3/8") discontinuous to laminated at 189.8', silt above yellowish gray (5Y 7/2), fossiliferous (molds, casts) No Recovery 190.3-191.0' Limestone 191.0-192.3' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, weak (R2), voids are micro forams and micro form molds up to 1/8"-1/4" over 20-25% of surface 192.3-192.8' - light olive gray, (5Y 5/6), fine grained, mild to moderate HCl reaction, very weak (R1), sharp change from 192.3-192.4' No Recovery 192.8-196.0' Limestone 196.0-198.85' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, medium strong (R3), trace voids, up to 10% very fine to fine black particles in matrix	R30: 9 minutes	
181.0			5	174.12' - Bedding plane, <10 deg, rough, planar, open 1/16-1/8"				
185 -143.1	R31-NQ 5 ft 98%	20	NR	174.22, 174.5, 174.9, 174.97, 175.2' - Bedding plane (5), horizontal, rough, undulating, open 1/2"		R31: 10 minutes		
186.0			5	175.75, 175.8' - Bedding plane (2), horizontal, rough, planar, open 1/8"				
190 -148.1	R32-NQ 5 ft 86%	13	4	177.0' - Fracture or mechanical break, horizontal, rough, undulating, brownish black staining, open 1/4"		R32: 8 minutes		
191.0			3	178.2' - Bedding plane or mechanical break, horizontal, rough, planar, top of fractured zone				
195 -153.1	R33-NQ 5 ft 36%	0	5	178.7' - Bedding plane or mechanical break, <10 deg, rough, planar, organic infill 1/16"		Appearance is "chalk like"		
196.0			NR	179.0, 179.2' - Bedding plane (2), 8-10 deg, rough, planar, organic infill 1/16"				
			>10	179.45, 179.55' - Bedding plane (2), 8-10 deg, rough, planar, open 1/16-1/8"		R33: 4 minutes		
			>10	179.75' - Bedding plane or mechanical break, 5-10 deg, rough, undulating, open 1/4", bedding contact brown, more organic layered unit underneath				
			>10	181.25' - Bedding plane, 5-10 deg, rough, undulating, organic infill 1/16"				
			>10	181.65, 181.75' - Bedding plane (2), horizontal, rough, undulating, tight				
			>10	181.85' - Fracture or mechanical break, 80-90 deg, rough, undulating, tight				
			NR	181.95' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight				
			>10	182.2' - Fracture, 75-85 deg, rough, undulating, tight				
			>10	182.4' - Fracture or mechanical break, horizontal, rough, undulating, open 1/2-3/4"				
			>10	182.75' - Fracture, horizontal, rough, undulating, tight to open 1/4"				
			>10	182.9' - Fracture or mechanical break, 10-20 deg, rough, planar, tight				
			NR	183.25' - Fracture or mechanical break, 10-15 deg, rough, planar, open 1/16"				
			NR	183.8, 183.9' - Fracture or mechanical break (2), 5-10 deg, rough, undulating, 183.8' open 1/8", 183.9' open 1/16", black staining				
			>10	184.1' - Bedding plane, horizontal, rough, undulating, tight				
			>10	184.4' - Bedding plane, 5-10 deg, smooth, undulating, open 1/8"				
			>10	184.55' - Bedding plane or mechanical break, 5-10 deg, rough, undulating, tight				
			>10	184.8, 184.81' - Bedding plane or mechanical break (2), 0-5 deg, smooth, undulating, tight				
			>10	184.9' - Bedding plane or mechanical break, 5-10 deg, rough, planar, tight				
			>10	185.2' - Bedding plane or mechanical break, 20-30 deg, rough, undulating, open 1/4-1/8"				
			>10	185.3' - Bedding plane or mechanical break, 60-70 deg, rough, undulating, tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 3/13/07 START : 3/13/2007 END : 3/22/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
200 -158.1	5 ft 80%	15	>10	185.5' - Bedding plane or mechanical break, rough, undulating, open 1/2-3/4" 185.6' - Bedding plane or mechanical break, rough, undulating, tight to open 1/16" 186.0' - Bedding plane or mechanical break, <10 deg, black staining or organic bedding planes 190.0' - Fracture zone 196.35, 196.45, 196.7' - Bedding plane or mechanical break (3), rough, planar, tight 198.85' - Bedding plane, 5-10 deg, smooth, planar, organics on surface 199.8' - Fracture or mechanical break, horizontal, rough, undulating, open 1/2"		Limestone 198.85-200.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak (R2), 60-70% tiny voids up to 1/8" (spherical), poorly fossiliferous (molds), 20% fine to medium grained black particles, brownish black staining near bottom No Recovery 200.0-201.0' Bottom of Boring at 201.0 ft bgs on 3/22/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. SC-7 collected at 198.85-199.8' R34: 8 minutes Final core run end at 12:19 Ending borehole construction 20' of 6" diameter casing, 80' of 3" diameter NW casing 203.0' NQ coring assembly Measured total depth at 200.0' below ground surface 3/22/07 15:03 depth measured at 177.0' then 148.0' after abandonment 3/23/07 08:13 Water level at 0.75' below ground surface Abandonment completion on 3/23/07 at 15:50 47 bags of Portland cement type I/II, 92 bags of Type Gel, 2 bags of Sure Plug bentonite, one 50lb bag of 3/8" bentonite chips, one 50lb bag of Quick Gel used for borehole abandonment
	201.0		NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-10	SHEET 1 OF 12
SOIL BORING 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
 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 bgs on 03/10/07 START : 2/25/2007 END : 3/11/2007 LOGGER : C. LeBlanc, T. Stewart, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
42.2						C. Sump and T. Stewart also logged part of boring A-10
5 37.2	5.0					Driller's Remark: Hard 5-13.5'
	0.8	SS-1	3-36-50/2 (86/8")	Poorly Graded Sand With Silt (SP-SM) 5.0-5.5' - dusky yellow, (5Y 6/4), moist, very dense, very fine to fine grained, no HCl reaction, 10% nonplastic fines Limestone Fragments 5.5-5.8' - very light gray, (N8), moist, very fine grained, mild HCl reaction, some orange staining		
10 32.2	10.0					Driller's Remark: Softened at 13.5-15'
	1.4	SS-2	8-18-50/5 (68/11")	Silt (ML) 10.0-11.4' - grayish yellow, (5Y 8/4), wet, very dense, very fine grained, nonplastic, very rapid dilatancy, moderate to strong HCl reaction, 10-15% sand material, slightly indurated 1" layers throughout		
15 27.2	15.0					
	1.5	SS-3	18-29-35 (64)	Silt With Sand And Limestone Fragments (ML) 15.0-16.5' - grayish yellow, (5Y 8/4), wet, fine to coarse grained, nonplastic, very rapid dilatancy, moderate HCl reaction, 20-25% fine to coarse sand-sized, 10% fine gravel-sized carbonate material		
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-10	SHEET 2 OF 12
SOIL BORING 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
 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 bgs on 03/10/07 START : 2/25/2007 END : 3/11/2007 LOGGER : C. LeBlanc, T. Stewart, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.2	20.0	0.2	SS-4	18-29-50/5 (79/11")	Silt With Sand (ML) 20.0-20.2' - Same as 15.0-16.5' except except one 1/2" gravel-sized carbonate fragment.		
	21.5						
25	25.0	0.1	SS-5	50/3 (50/3")	Silty Sand (SM) 25.0-25.1' - dusky yellow, (5Y 6/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, sand-sized carbonate material, 30% fines		
17.2	25.3						
30	30.0	0.3	SS-6	50/4 (50/4")	Silty Sand (SM) 30.0-30.3' - dark yellowish orange, (10YR 6/6), moist, very dense, fine to coarse grained, moderate HCl reaction, 25% silt-sized grains, carbonate material		Sample SS-6 has the appearance of extremely weak limestone.
12.2	30.3						
35	35.0	0.2	SS-7	50/2 (50/2")	Limestone Fragments 35.0-35.2' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, mild to moderate HCl reaction, gravel fine to coarse to 1", fossiliferous		
7.2	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-10	SHEET 3 OF 12
SOIL BORING 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
 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 bgs on 03/10/07 START : 2/25/2007 END : 3/11/2007 LOGGER : C. LeBlanc, T. Stewart, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#	TYPE				
2.2	40.0	1.3	SS-8	31-47-45 (92)	Sandy Silt (SM) 40.0-41.3' - moderate yellowish brown, (10YR 5/4), moist to wet, hard, mild to moderate HCl reaction, 49% sand and gravel, 10-15% fines, carbonate materials		
	41.5						
45	45.0	0.8	SS-9	40-50/3 (90/9")	Silty Sand (SM) 45.0-45.75' - Same as 40.0-41.3' except trace gravel-sized rock fragments		
-2.8	45.8						
50	50.0	0.1	SS-10	50/4.5 (50/4.5")	Limestone Fragments With Silty Sand 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		
-7.8	50.4						
55	55.0	0.1	SS-11	50/3 (50/3")	Limestone Fragments 55.0-55.1' - Same as 50.0-50.1'		
-12.8	55.3						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-10	SHEET 4 OF 12
SOIL BORING 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
 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 bgs on 03/10/07 START : 2/25/2007 END : 3/11/2007 LOGGER : C. LeBlanc, T. Stewart, C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)						DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.8	60.0	0.1	SS-12	50/1 (50/1")	Limestone Fragments 60.0-60.1' - light olive gray, (5Y 5/2), mild to moderate HCl reaction		61.5-62.0' Heavy chatter, drill time increases, cuttings show weak limestone fragments, light olive gray, (5Y 5/2), finish soil drilling at 62', switch to rock coring, see rock core log
	62.0						
	62.1	0.0	SS-13	50/1 (50/1")	Limestone Fragments 62.0-62.1' - light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2) Begin Rock Coring at 62.0 ft bgs See the next sheet for the rock core log		
65 -22.8							
70 -27.8							
75 -32.8							
80							



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
62.0	R1-NQ 5 ft 68%	NA		62.0-62.5' - Fracture zone or mechanical break, rough, rock fragments, irregular fractures	Silt (ML) 62.0-62.5' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, silt with very fine sand, (20-25%) carbonate material Limestone 62.5-63.5' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/16" over 10-15% of surface 63.5-64.0' - Same as 62.5-63.5' except except weaker and friable 64.0-65.4' - Same as 62.5-63.5' except weak (R2), except voids 1/4"-3/8" over 1-2% of surface (fossil molds), some infilling No Recovery 65.4-67.0' Limestone 67.0-68.6' - dusky yellow, (5Y 6/4), 15-25% voids (1/16"-1/8") over surface, few larger voids (fossil molds), trace dark gray crystals trace clear recrystallized calcite, subhedral to euhedral in voids 68.6-69.3' - grayish yellow, (5Y 8/4), moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), finely laminated 69.3-71.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), 10-15% voids (up to 1/16") over surface, few variably spaced larger voids/cavities (fossil molds up to 3/8"), fine (1/16") clear subhedral to euhedral carbonate crystals in few void spaces No Recovery 71.7-72.0' Limestone 72.0-74.4' - dusky yellow, (5Y 6/4), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids (1/32"-1/16") variable density across surface ranging from 15-25% in zones, few larger void/cavities, (fossil molds), very fine, black, wavy laminations Silt (ML) 74.4-76.3' - very light gray, (N8), strong HCl reaction, very weak (R1), 5% limestone clasts up to 3/8", sub rounded to rounded, light olive gray (5Y5/2), laminated zone with light gray consolidated silt fragments up to 9/16" Limestone 76.3-76.7' - Same as 72.0-74.4' No Recovery 76.7-77.0'	C. Sump begins logging at 62.0'	
		>10		62.9' - Fracture, rough, undulating			
		>10		63.4' - Fracture, rough, undulating			
		1		63.4-64.0' - Fracture zone, rough, irregular fractures			
		1		64.0' - Fracture, horizontal, smooth, planar			
65 -22.8			NR	65.0' - Fracture, horizontal, rough, undulating 65.1' - Fracture, 70 deg, rough, undulating 65.4' - Fracture, horizontal, rough, undulating			
67.0	R2-NQ 5 ft 94%	3		67.0, 67.1, 67.9, 68.6, 68.8, 68.9' - Fractures (6), horizontal, rough, undulating to planar	Driller's remark: Soft 65.0-66.0'		
		3					
70 -27.8		2		69.0-69.1' - Fracture zone, rock fragments 69.1' - Bedding plane, horizontal, smooth to rough, stepped 69.3' - Bedding plane, horizontal, smooth to rough, undulating to stepped			
		2		70.2, 70.6' - Mechanical break (2), 10 deg, rough, undulating to planar 71.4, 71.7' - Fractures (2), horizontal, rough, stepped			
72.0	R3-NQ 5 ft 94%	NR			R1: 3 minutes		
		3		72.3' - Fracture, 10 deg, rough, undulating, irregular fractures			
		3		72.4-73.6' - Fracture zone, 70-85 deg, rough, undulating, intersecting high angle fracture set, few surface pyrite coatings			
		3		73.9' - Fracture or mechanical break, horizontal, rough, undulating			
75 -32.8		NA		74.4' - Fracture, horizontal, rough, stepped, undulating parting, black finely laminated organic layer 74.41' - Fracture, rough, clay infilling, fractures with light olive gray (5Y 5/2) silty clay infilling on surface			
		2		74.9' - Fracture, rough, dark brown/black coating on surface, organics- pyrite			
77.0	R4-NQ 5 ft 94%	NR		76.3-76.7' - Fractures (2), smooth	R2: 5 minutes		
		2		77.0-77.5' - Fracture zone			
		3		77.5, 77.55' - Fractures (2), horizontal, rough, irregular fractures			
		>10		78.3-78.6' - Fractures (2), 60 deg, rough, undulating, tight, partially healed fractures, fine black speckled staining			
80 -37.8		3		78.8-79.3' - Fracture zone, 60-90 deg, rough, undulating, multiple high angle fractures, open to tight, dark gray-black speckled staining			
		2		79.3-79.4' - Fracture zone, rock fragments			
82.0	NR		80.4, 80.6, 80.8, 81.1' - Fractures (4), rough, planar, irregular	R3: 8 minutes			
					R4: 9 minutes		



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -42.8	R5-NQ 5 ft 60%	58	2	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 84.7' - Fracture, 45 deg, rough, planar, some fine grained pyrite coating	[Symbolic Log Pattern]	Sand (SW) 77.0-77.5' - strong HCl 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 HCl reaction, medium strong (R3), few larger voids irregular shaped up to 3/4" in size with dark olive gray staining. Silt (ML) 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 82.0-85.0' - grayish orange, (10YR 7/4), moderate to strong HCl 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 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 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'	SC-2 collected at 85.06-86.06' R5: 4 minutes
87.0		NR					
90 -47.8	R6-NQ 5 ft 82%	60	2	87.0' - Mechanical break, horizontal, rough, undulating 87.7-88.2' - Fracture zone, discontinuity with weak limestone interbedded	[Symbolic Log Pattern]		
			1	88.8' - Fracture, 10 deg, rough, undulating, 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			
92.0			4	90.3' - Mechanical break, horizontal 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 fragments			R6: run time not recorded
95 -52.8	R7-NQ 5 ft 80%	48	2	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	[Symbolic Log Pattern]		
			NA				
97.0			>10				R7: run time not recorded
99.0			NR				
100 -57.8	R8-NQ 5 ft 60%	22	2				
			2				
			3				
			NR				R8: run time not recorded
102.0							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.8	R9-NQ 5 ft 65%	38	>10 >10 0 0	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")	R9: 4 minutes	
107.0			NR	107.1' - Fracture, 45-60 deg	Limestone 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 8/1), strong HCl 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 HCl 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 HCl reaction, weak (R2), highly fossiliferous(molds and casts) up to 30-40%, somewhat friable No Recovery 116.8-117.0' Sand (SP) 117.0-117.3' - strong HCl reaction, well sorted carbonate sand, 5% fine clear subhedral calcite crystals, possible trace silica grains, possibly slough	SC-3 collected at 107.3-108.35'	
110 -67.8	R10-NQ 5 ft 100%	54	1 1 2 2 6	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 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		R10: 4 minutes	
115 -72.8	R11-NQ 5 ft 96%	86	1 3 1 2	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		R11: 5 minutes	
120 -77.8	R12-NQ 5 ft 100%	70	NR 5 3 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		R12: run time not recorded	
122.0							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -82.8	R13-NQ 5 ft 78%	15	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, 125.25, 125.4, 125.5, 125.6, 125.7, 125.8, 122.8' - Mechanical break (19), horizontal, smooth, planar		Limestone 117.3-117.9' - pale yellowish gray, (5Y 8/1), coarse grained, very weak to weak (R1 to R2), fossiliferous mold and casts up to 3/16", friable into coarse sand particles, 10-15% argillaceous sand, iron staining on all sand sized inclusions 117.9-122.0' - very pale yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), increasing percentage of large fossil molds/casts up to 3/8", few cavities infilled with very fine grained silty material 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 four 3/16"x3/16" trace ellipsoid shaped cavities, 30% fine to medium grained black particles, 15% fine grained white particles (fossil fragments), color change to yellowish gray (5Y 8/1) at 128.65' 124.65-125.9' - Same as 122.0-124.65' except medium grained, moderately fossiliferous, medium gray (N5) lense at 125.5' No Recovery 125.9-127.0 Limestone 127.0-128.95' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, weak (R2), 15% fine grained black particles, moderately fossiliferous (fossil fragments, casts), voids over 45% of surface, trace short black laminations <1/16" thick near 128.8' 128.95-130.2' - yellowish gray, (5Y 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' No Recovery 130.2-132.0 Limestone 132.0-135.8' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, weak (R2), 10-15% voids up to 1/16", trace to many ellipsoidal cavities up to 1-1/10", infilled with medium gray color, cavity size increase with depth, up to 40% very fine to fine grained fossil fragments in matrix, medium grained from 135.15-135.7', laminated from 132.0-132.35' (moderate olive brown - 5Y 4/4) with medium grained particles, organic laminations <1/16" at 134.0'	NQ rod stuck at 117.0' after completing R-12, hole abandoned and replacement hole drilled to obtain information below 122' T. Stewart begins logging at 122' NW casing at 120' below ground surface, water level 1.0' below ground surface R13: 19 minutes R14: 24 minutes Driller's Remark: 50% circulation loss near top of R14-NQ R15: 13 minutes Driller's Remark: Return of circulation at approximately 135.0' below ground surface R16: 22 minutes	
			3	122.95' - Fracture, 40 deg, smooth, undulating, open, black particles (1/5"-1/3") in matrix on surface				
			6					
			7					
			NR					
130 -87.8	R14-NQ 5 ft 64%	0	>10	127.8' - Fracture, vertical, smooth, undulating, tight, black staining				
			5	128.1, 128.2, 128.4, 128.75' - Mechanical break (4), horizontal, smooth, planar				
			>10					
			0					
			NR					
135 -92.8	R15-NQ 5 ft 88%	23	7	132.35' - Fracture, 50 deg, smooth, stepped, tight				
			>10	132.4, 132.55, 132.65, 132.75, 132.9, 133.1, 133.23, 133.35, 133.55, 133.65, 133.75, 134.55' - Mechanical break (12), horizontal, smooth, planar				
			>10					
			4	134.85' - Fracture, 5 deg, rough, undulating, open 2/5"				
			0	135.05, 135.15' - Mechanical break (2)				
			NR	135.53' - Fracture, horizontal, smooth, undulating, tight to open 1/10"				
			NR	135.77' - Fracture, 5 deg, rough, undulating, open 3/4", 2/5" thick infilling				
140 -97.8	R16-NQ 5 ft 56%	7	>10	138.05' - Fracture, vertical, tight, healed				
			>10	138.1-138.3' - Fracture zone				
			2	138.7' - Fracture, 70 deg, tight, healed, 1/16" thick infilling				
			NR	138.95, 139.15' - Fractures (2), 50 deg, rough, undulating, tight				
			NR	139.55' - Fracture, vertical, tight, vertical, black staining, 1/16" thick infilling				
			NR					
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
145 -102.8	R17-NQ 5 ft 80%	37	>10	142.0-143.8' - Fracture zone		135.8-136.4' - light olive gray, (5Y 6/1), strong HCl reaction, weak to medium strong (R2 to R3), trace voids up to 1/16", many irregularly shaped cavities up to 2-2/5" long x 2/5" wide, infilled with moderate olive brown (5Y 4/4) medium to coarse grained material No Recovery 136.4-137.0' Limestone 137.0-139.8' - light olive gray, (5Y 6/1), very fine grained, strong HCl reaction, medium strong (R3), 75% voids up to 1/8"x3/16", cavities over 15-20% of surface (near top of run), infilled with coarse grained material, brownish black laminations <1/16" containing sub rounded clasts up to 3/16" in size at 138.4-138.6', series of 70-90 degree fractures (healed tight) over 138.6 to 139.8' interval with black mottled appearance No Recovery 139.8-142.0' Limestone 142.0-143.8' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), matrix grain colors are white (N9) (33%), yellowish gray (5Y 8/1) (33%), and gray (33%) 143.8-144.1' - Same as 142.0-143.8' except brown and white laminations with trace cavities infilled with white material 144.1-145.05' - Same as 143.8-144.1' except light olive gray (5Y 5/2), 15-20% coarse grained gray particles 145.05-146.0' - Same as 143.8-144.1' except fine grained, no gray particles No Recovery 146.0-147.0' Limestone 147.0-148.37' - dark yellowish orange, (10YR 6/6), fine to medium grained, moderate HCl reaction, weak (R2), 3/16"x1/8" voids over 15% of surface, fossiliferous (trace molds), bedding plane at 147.9' at 40 degrees 148.37-148.93' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, extremely weak (R0) 148.93-150.74' - dark yellowish orange, (10YR 6/6), fine to coarse grained, strong HCl reaction, weak (R2), trace voids to 1/16" over <5% surface, some infill of white material, trace fine to medium grained black particles No Recovery 150.74-152.0	SC-4 collected at 144.1-145.05'	
			1	143.8' - Fracture, horizontal, rough, planar, open				
			1	144.1, 145.0' - Fractures (2), horizontal, rough, planar, tight				
			0					
			NR					
150 -107.8	R18-NQ 5 ft 75%	58	0	148.1, 148.2, 148.3, 148.32' - Bedding plane (4), horizontal, rough, planar, tight to open 1/10"			R17: 17 minutes	
			5	148.93' - Bedding plane, horizontal, rough, planar, silty infilling			Last core run on 3/10/07 Resume drilling 07:55 on 3/11/07	
			2	149.4, 150.0, 152.05, 152.1' - Mechanical break (4)			SC-5 collected at 147.0-148.1'	
			0					
			NR					
155 -112.8	R19-NQ 5 ft 86%	39	2	153.3' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4"			R18: 22 minutes	
			5	153.43' - Bedding plane, horizontal, smooth, undulating, tight				
			>10	153.48, 153.55, 153.63' - Bedding plane (3), horizontal, smooth, planar, tight			Driller's Remark: Continued loss of circulation	
			6	153.6' - Fracture, vertical, rough, undulating, tight, black particles in matrix				
			NR	153.8' - Bedding plane or mechanical break, horizontal, smooth, planar, tight			R19: 14 minutes	
			4	154.05' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open 1/4"				
			4	154.05-155.5' - Fracture zone				
			4	157.25, 157.4' - Bedding plane or mechanical break (2), <10 deg, smooth, undulating, open 1/4"				
			1	157.45' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open 1/2"				
			>10	157.8' - Bedding plane or mechanical break, horizontal, smooth, undulating, open 1/8"				
			NR	158.05' - Bedding plane or mechanical break, smooth, undulating, open 1/8"-1/4"			R20: 19 minutes	
			NR	158.47, 158.95' - Bedding plane or mechanical break (2), horizontal, open 1/8"-1/2"				
			NR					



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
165 -122.8	R21-NQ 5 ft 88%	18	9	159.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/4"-1/2"	Limestone 152.0-156.3' - very pale orange, (10YR 8/2), strong HCl reaction, weak (R2), voids to 1/8" covering 25-30% of surface, moderately fossiliferous, (mold and casts) 5-10% white inclusions up to 1-1/4" (irregular shape), fine brownish black laminations (<1/16") at 153.48-153.63', contains vertical fracture across interval, up to 20% fine black particles No Recovery 156.3-157.0' Limestone 157.0-161.6' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids up to 1/8" elliptical, poorly fossiliferous (few molds, casts), 3/8"x3/16", bedding plane laminations <1/16" from 160.2-161.6' No Recovery 161.6-162.0' Limestone 162.0-166.4' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 5/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" over 40% of surface, 163.0-163.09' interval has voids to 3/16" covering 90% of surface, moderately fossiliferous from 163.0-163.9' (some molds), 2"x1/4" inclusions up to 5%, from 163.0-163.1', irregular shaped inclusions, medium gray in color. No Recovery 166.4-167.0' Limestone 167.0-171.2' - moderate olive brown, (5Y 4/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/8" over 15-20% of surface, cavities (1/4"x1") from 168.05-168.04' poorly fossiliferous (trace molds), horizontal wavy laminations (<1/16") at 170.5 No Recovery 171.2-172.0' Limestone 172.0-176.2' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/8"x3/16" over 10-15% of surface, cavities up to 1"x1/2" over 5% of surface, poorly fossiliferous (few casts), mottling of slightly darker hue up to 20% No Recovery 176.2-177.0'	R21: 19 minutes		
			2	159.3, 159.4' - Mechanical break (2)				
			6	160.05-161.3' - Fracture zone or mechanical break, horizontal, smooth, planar				
			>10	162.27, 162.3, 162.4, 162.6, 162.7, 162.75, 162.82, 162.9, 162.98' - Bedding plane or mechanical break (9), smooth, planar, tight to open 1/8"				
			NR	163.9' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4", dark staining				
			2	163.98' - Bedding plane or mechanical break, <10 deg, rough, undulating, black staining				
			3	164.1, 169.25, 164.4, 164.5, 164.85, 164.95' - Bedding plane or mechanical break (6), horizontal, smooth, planar to undulating, tight to open 1/8"-1/4"				
			3	166.0' - Mechanical break				
			4	166.1' - Bedding plane or mechanical break, horizontal, smooth, planar, tight to open 1/8"				
			0	166.25-166.3' - Fracture (2), 80 deg, rough, undulating, tight, reddish brown staining				
170 -127.8	R22-NQ 5 ft 84%	31	3	167.05' - Mechanical break or bedding plane, horizontal, smooth, planar, tight				
			4	167.75-167.9' - Fracture zone				
			NR	168.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"-1/4"				
			NR	168.2' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight to open 1/4"-3/4"				
			3	168.4' - Bedding plane, smooth, undulating, open 1/4"				
			6	169.3' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4"				
			4	169.55-169.7' - Fracture zone				
			6	169.8' - Bedding plane, horizontal, smooth, undulating, 1/8"-1/4" open				
			1	170.1' - Bedding plane or mechanical break, <10 deg, smooth, undulating, 1/8"-1/4" open				
			NR	170.3-170.5' - Fracture zone				
175 -132.8	R23-NQ 5 ft 84%	35	6	170.7-170.8' - Bedding plane (2), <10 deg, tight, dark staining				
			NR	172.05' - Bedding plane, horizontal, smooth, undulating, crystal traces on surface, open 1/4"				
			6	172.15' - Bedding plane, horizontal, smooth, planar, open 1/8"-1/4"				
			0	172.3-172.55' - Fracture zone				
			2	173.2' - Bedding plane, horizontal, smooth, undulating, crystals on surface of fracture, open 1/8"				
			>10	173.3' - Bedding plane, <10 deg, smooth, undulating, crystals covering 30% of surface, open 1/4" to 1/2"				
			NR	173.45, 173.75, 173.87, 173.9, 174.0, 174.03' - Bedding plane (6), horizontal, smooth, planar, crystals covering surface, tight to open 1/8"				
			NR	174.1' - Bedding plane, horizontal, smooth, undulating, crystals, open 1/8"-1/4"				
			NR	174.2-174.35' - Fracture zone, 3/4" fragments				
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-10	SHEET 11 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
185 -142.8	R25-NQ 5 ft 92%	40	4	175.45, 175.6, 175.8, 175.85, 175.95, 175.98, 176.05' - Bedding plane (7), horizontal, smooth, undulating, crystals on surface, tight to open 1/4"	[Symbolic Log]	Limestone 177.0-177.95' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/8" covering 15-20% of surface, wavy dark brown laminations at 177.8' to sharp contact (bedding plane) at 117.95', 25 degree bedding plane 177.95-180.9' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" covering 30-40% of surface, cavities (fossil molds) up to 1"x2" covering <5% of surface, moderate fossiliferous (casts, molds), very fine grained, very pale orange (10YR 8/2) wavy beds up to 1"1/2" from 179.65-180.35' and 180.5-180.68' No Recovery 180.9-182.0' Limestone 182.0-186.6' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" on 40-60% of surface, cavities (irregular shaped) up to 3/8"x3/16" over 10-20% of surface, moderately fossiliferous (molds and casts) No Recovery 186.6-187.0' Limestone 187.0-188.15' - Same as 182.0-186.6' 188.15-191.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), weaker at bottom of interval, medium strong (R3) at base, voids up to 3/16" covering 5-15% of surface, trace cavities 3/4"-1/8" with no infill, poorly fossiliferous, (mostly casts, molds), trace organics No Recovery 191.8-192.0' Limestone 192.0-193.25' - Same as 182.0-186.6' 193.25-194.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace black color laminations, trace very fine to fine black particles No Recovery 194.2-197.0' Limestone 197.0-197.15' - Same as 193.25-194.2' No Recovery 197.15-202.5'	Driller's Remark: 183.0-184.5' was hard drilling, had to increase pump pressure R25: 28 minutes SC-7 rejected due to size requirements, total of six (6) special cores taken from boring A-10/A-10R R26: 11 minutes Driller's Remark: Circulation regained R27: 12 minutes R28: 10 minutes End of coring at 15:21 on 3/11/07, boring grouted to surface with Portland cement type I/II, type GU on 3/13/07	
			4	177.0-177.05' - Fracture zone				
			6	177.25, 177.5, 177.55' - Bedding plane (3), horizontal, smooth, undulating, crystals on surface, tight to 1/8"				
			3	177.65' - Bedding plane, <10 deg, smooth, undulating, open 1/4"-1/2"				
			1	177.8' - Bedding plane, horizontal, smooth, planar, tight to open 3/4"				
			NR	179.0' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"-1"				
			NR	179.85' - Fracture or mechanical break, horizontal, rough, undulating, tight to open 1/2"				
			3	180.05-180.15' - Fracture zone, up to 1" fragments				
			3	180.2-180.3' - Bedding plane (2), horizontal, smooth, planar, tight to open 1/8"				
			3	180.25' - Fracture or mechanical break, vertical, smooth, undulating, tight				
190 -147.8	R26-NQ 5 ft 96%	31	3	180.45' - Bedding plane, <10 deg, rough, undulating, open 1/4"-3/4"	[Symbolic Log]	182.0-186.6' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" on 40-60% of surface, cavities (irregular shaped) up to 3/8"x3/16" over 10-20% of surface, moderately fossiliferous (molds and casts) No Recovery 186.6-187.0' Limestone 187.0-188.15' - Same as 182.0-186.6' 188.15-191.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), weaker at bottom of interval, medium strong (R3) at base, voids up to 3/16" covering 5-15% of surface, trace cavities 3/4"-1/8" with no infill, poorly fossiliferous, (mostly casts, molds), trace organics No Recovery 191.8-192.0' Limestone 192.0-193.25' - Same as 182.0-186.6' 193.25-194.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace black color laminations, trace very fine to fine black particles No Recovery 194.2-197.0' Limestone 197.0-197.15' - Same as 193.25-194.2' No Recovery 197.15-202.5'	R26: 11 minutes Driller's Remark: Circulation regained R27: 12 minutes R28: 10 minutes End of coring at 15:21 on 3/11/07, boring grouted to surface with Portland cement type I/II, type GU on 3/13/07	
			2	180.6, 180.8' - Bedding plane (2), <10 deg, rough, undulating, open 1/4"-1/2"				
			4	182.15, 182.5, 182.6, 182.85' - Bedding plane (4), horizontal, smooth, undulating, tight to open 1/8"				
			NR	183.25-183.35' - Fracture zone, rock fragments up to 1"				
			>10	183.7, 183.77, 183.9' - Bedding plane (3), horizontal, smooth, planar, open 1/4"-1/2"				
			>10	184.10-184.20' - Fracture zone, rock fragments up to 1-1/2" fractures				
			0	184.4' - Bedding plane, horizontal, smooth, planar, open 1/8"-1/4"				
			NR	184.45' - Bedding plane, <10 deg, smooth, undulating, open 1/8"				
			NR	184.65' - Bedding plane, horizontal, smooth, planar, open 1/8"-1/4", dark staining				
			NR	184.9-185.05' - Fracture zone, rock fragments up to 2"				
195 -152.8	R27-NQ 5 ft 44%	12	>10	185.2' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open 1/8"-1/4"	[Symbolic Log]	182.0-186.6' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" on 40-60% of surface, cavities (irregular shaped) up to 3/8"x3/16" over 10-20% of surface, moderately fossiliferous (molds and casts) No Recovery 186.6-187.0' Limestone 187.0-188.15' - Same as 182.0-186.6' 188.15-191.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), weaker at bottom of interval, medium strong (R3) at base, voids up to 3/16" covering 5-15% of surface, trace cavities 3/4"-1/8" with no infill, poorly fossiliferous, (mostly casts, molds), trace organics No Recovery 191.8-192.0' Limestone 192.0-193.25' - Same as 182.0-186.6' 193.25-194.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace black color laminations, trace very fine to fine black particles No Recovery 194.2-197.0' Limestone 197.0-197.15' - Same as 193.25-194.2' No Recovery 197.15-202.5'	R26: 11 minutes Driller's Remark: Circulation regained R27: 12 minutes R28: 10 minutes End of coring at 15:21 on 3/11/07, boring grouted to surface with Portland cement type I/II, type GU on 3/13/07	
			0	185.6' - Fracture or mechanical break, 20 deg, rough, undulating, tight				
			NR	185.61' - Fracture or mechanical break, 70 deg, rough, undulating, tight				
			NR	187.3-187.5' - Fracture zone, rock fragments to 1-1/2"x1-1/5"				
			NR	187.55, 187.8, 187.9, 188.05' - Bedding plane (4), <10 deg, smooth, undulating, 188.05' has black stains, open 1/4"				
			NR	188.8, 188.95' - Fractures or mechanical break (2), 40 deg, rough, undulating, tight				
			NR	189.25' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
200 -157.8	R28-NQ 5.5 ft 0%	0	NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight	[Symbolic Log]	182.0-186.6' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" on 40-60% of surface, cavities (irregular shaped) up to 3/8"x3/16" over 10-20% of surface, moderately fossiliferous (molds and casts) No Recovery 186.6-187.0' Limestone 187.0-188.15' - Same as 182.0-186.6' 188.15-191.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), weaker at bottom of interval, medium strong (R3) at base, voids up to 3/16" covering 5-15% of surface, trace cavities 3/4"-1/8" with no infill, poorly fossiliferous, (mostly casts, molds), trace organics No Recovery 191.8-192.0' Limestone 192.0-193.25' - Same as 182.0-186.6' 193.25-194.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace black color laminations, trace very fine to fine black particles No Recovery 194.2-197.0' Limestone 197.0-197.15' - Same as 193.25-194.2' No Recovery 197.15-202.5'	R26: 11 minutes Driller's Remark: Circulation regained R27: 12 minutes R28: 10 minutes End of coring at 15:21 on 3/11/07, boring grouted to surface with Portland cement type I/II, type GU on 3/13/07	
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				
			NR	189.35' - Bedding plane, <10 deg, smooth, planar, tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
202.5				189.95' - Bedding plane, horizontal, smooth, planar, tight 190.0' - Fracture zone, 60 deg, smooth, undulating, tight 190.3-190.45, 190.6-190.8' - Fracture zone (2), up to 2" rock fragments 191.1' - Fracture or mechanical break, 60 deg, rough, undulating, open 7/8"-1" 191.35, 191.45, 191.55' - Bedding plane (3), horizontal, smooth, undulating, open 1/8"-1/4" 192.0-193.35' - Fracture zone, well graded pieces of limestone fragments 1/4"-2" subangular shapes and several 3/8"-1/2" discs 193.1-193.4' - Fracture zone, pieces 1/4"-2" sub angular shapes and several 3/8"-1/2" discs 193.95-194.2' - Fracture zone, poorly graded limestone, 1" subangular rock fragments		Bottom of Boring at 202.5 ft bgs on 3/11/2007	



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.5	0.0	1.3	SS-1	2-2-2 (4)	Topsoil 0.0-0.3' - grayish black, (N2), moist, roots up to 3/8" diameter, organics Poorly Graded Sand With Silt (SP-SM) 0.3-0.9' - pale yellowish brown, (10YR 6/2), moist, very loose, very fine to fine grained, silica sand, rounded grains, 5% nonplastic fines, trace of very fine sand-sized black particles 0.9-1.25' - moderate yellowish brown, (10YR 5/4), moist, very loose, very fine to fine grained, silica sand, 15% nonplastic fines, trace very fine grained particles of a dark yellowish orange and very fine grained black particles		5' sections of NW rod, 24" split spoon (SS), 50 lb bags of Quik Gel brand bentonite
5	1.5						10:36 1/4 bag bentonite added to full mud vat using 3-7/8" tricone roller bit
37.5	5.0	1.0	SS-2	6-6-4 (10)	Clayey Sand (SC) 5.0-6.0' - pale blue green, (5BG 7/2), wet, loose, 16% medium plastic fines, silica sand, trace very fine sand-sized black particles, brownish black staining around roots, trace of coarse sand-sized yellowish gray (5Y 8/1) particles, trace 1/8" rootlets, brownish black staining around rootlets		Driller's Remark: 8.5' below ground surface change in drilling
10	6.5						9.5' stiffened up (harder drilling)
32.5	10.0	0.3	SS-3	50/3 (50/3")	Lean Clay With Silt (CL-ML) 10.0-10.25' - Same as 5.0-6.0' except hard, no organics		Driller's Remark: 12.5' started losing water
15	10.3						Hard at 14.0', approximately 40-50% circulation loss, add 1/2 bag bentonite then added another 1/8 bag to mud vat
27.5	15.0	0.1	SS-4	50/4 (50/4")	Limestone Fragments 15.0-15.3' - grayish to dusky yellow, (5Y 8/4 to 5Y 7/4), mild to moderate HCl reaction, 20-30% voids <1/8" in size, spherical to elongated in shape, trace brilliant green very fine grained particles, voids are possible microfossils		
20	15.3						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				50/5 (50/5")			
22.5	20.4	0.3	SS-5	50/5 (50/5")	Silty Sand With Gravel (SM) 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		Driller's Remark: Hard at 22.5' then very soft drilling from 23.0-25.0'
25 17.5	25.0	1.1	SS-6	35-34-20 (54)	Silt With Sand (ML) 25.0-26.1' - dusky yellow, (5Y 6/4), trace white mottling, moist to wet, dense, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% very fine sand-sized, 5-10% fine to medium sand-sized, trace fine sand-sized brilliant green particles, all carbonate		Driller's Remark: Hard at 27.0'
	26.5						
30 12.5	30.0	1.2	SS-7	40-30-34 (64)	Silt With Sand (ML) 30.0-31.15' - Same as 25.00-26.1' except lenses of very fine grain sized limestone		Driller's Remark: Soft again at 29.0'
	31.5						
35 7.5	35.9	0.1	SS-8	50/1 (50/1")	Limestone Fragments 35.0-35.05' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), coarse grained, mild HCl reaction, very poor recovery Begin Rock Coring at 35.5 ft bgs See the next sheet for the rock core log		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 pressure applied Driller's Remark: Approximately 20 minutes to drill 34.0-35.0' Driller's Remark: Will switch over to NQ coring assembly
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
35.5	R1-NQ 5 ft 96%	93	0		Limestone 35.5-40.3' - light olive gray to moderate olive brown with yellowish gray mottling, (5Y 5/2 to 5Y 4/4 with 5Y 7/2), mild to moderate HCl reaction, very weak (R1), strength decreasing with depth, 35.5 to 37.0' medium strong (R3), poorly fossiliferous (casts), trace black particles and short 3/8" discontinuous laminations, 1/8" voids over 20-30% of surface, fossiliferous up to 3/4" long	3" NW set to 35.5' below ground surface using casing advancer Start R1 at 15:56 Added 1/4 bag bentonite to full mud vat Driller's Remark: Soft at 38.0' R1: 5 minutes	
			0	36.75, 38.0' - Mechanical break (2)			
			1	38.35' - Fracture, 50 deg, rough, undulating, tight			
			2	38.8, 39.2' - Fracture (2), 50 deg, rough, undulating, tight			
40 2.5			1	40.2' - Fracture, 60 deg, rough, undulating, tight			
40.5	R2-NQ 5 ft 58%	35	NR	40.5-40.75' - Fracture zone	No Recovery 40.3-40.5' Limestone 40.5-43.4' - Same as 35.50-40.3' except some void infilling with soft gray (N4) fine material No Recovery 43.4-45.5'	R2: 3 minutes	
			>10	40.5-40.75' - Fracture zone			
			>10	41.95-42.3' - Fracture zone, tight			
			3	42.85' - Fracture, 60-70 deg, rough, undulating, tight			
45 -2.5			NR	42.95' - Mechanical break, horizontal, rough, undulating, tight			
45.5	R3-NQ 5 ft 60%	23	>10	43.0, 43.1' - Fracture (2), horizontal, rough, undulating, tight	Limestone 45.5-48.5' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, 45.5-45.8' carbonate silts 46.0-46.7' extremely weak rock (R0), crumbles under thumb pressure 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, poorly fossiliferous (casts up to 3/4"), 1/2" elongate trace cavities with no infill, trace medium grained black particles (organics), similar to 35.5-45.5' No Recovery 48.5-50.5' Limestone 50.5-54.55' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, medium strong (R3), extremely weak rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8" spheroidal) up to 25-30% of surface, moderately fossiliferous (casts up to 1/2" in size)	47.5' Started losing water Driller's Remark: Will set 5' more 3" NW casing R3: 3 minutes	
			>10	45.5-48.2' - Fracture zone			
			>10	47.15' - Mechanical break, <1/32" soft silt infill over 25-35% of surface			
			>10	47.9-48.2' - Fracture zone, 2-1/2"-3" crumbled core fragments			
50 -7.5			NR				
50.5	R4-NQ 5 ft 81%	75	1	51.05, 51.7, 51.9, 53.9' - Mechanical break or bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to 1-1/2"	No Recovery 54.55-55.5'	R4: 5 minutes	
			2	52.5' - Mechanical break, tight			
			1	53.25' - Bedding plane or mechanical break, 0-10 deg, rough, undulating, tight			
			1				
55 -12.5			NR				
55.5							



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, 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
60 -17.5	R5-NQ 5 ft 100%	87	2	55.5' - Bedding plane or mechanical break, horizontal, rough, planar, tight	□	Limestone 55.5-60.5' - light olive gray to 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, moderately fossiliferous (cast up to 3/8"), trace black particles (possibly organics)	Approximately 1.0' below ground surface water level, core run ended at 8:07, first core run on 4/22/07 T. Stewart/A. Bonilla are the loggers.
			1	56.35, 57.15, 57.6, 58.3, 59.25' - Bedding plane or mechanical break (5), horizontal, rough, undulating, tight to 1" open			
			2				
			1				
			0				
65 -22.5	R6-NQ 5 ft 100%	100	1	61.1, 62.0, 63.45' - Mechanical break or bedding plane (3), horizontal, rough, undulating, tight	□	60.5-65.5' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, very weak (R1), voids (<1/16") 20-25% of surface, poorly fossiliferous (casts up to 1/16" elongated), trace black particles, 10%-15% organics as medium grain particles and laminations under 1/16" thick horizontally aligned, medium strong rock (R3), stress joints over 61.0-62.0' vertically oriented	R5: 6 minutes SC-1 collected at 61.1-62'
			1				
			1	62.4, 62.7, 63.0, 65.1, 65.4' - Mechanical break (5), tight			
			0				
			0				
70 -27.5	R7-NQ 5 ft 96%	93	0		□	Limestone 65.5-70.3' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), mild HCl reaction, medium strong (R3), 1/8" voids on 15-20% of surface, some voids filled with hard, medium gray (N5) mineralization, poorly fossiliferous (casts up to 1/8" elongated)	T. Stewart is the logger.
			2	66.7' - Fracture, 40 deg, rough, undulating, tight			
			1	67.35' - Mechanical break or bedding plane, horizontal, rough, undulating, open up to 1/2"			
			1	68.3' - Fracture, vertical, rough, undulating, tight			
			1	68.65' - Fracture, 55-60 deg, rough, undulating, tight			
			1	69.4' - Mechanical break, horizontal, rough, undulating, tight			
			NR	70.05' - Fracture, 50-60 deg, rough, undulating, tight			
75 -32.5	R8-NQ 5 ft 72%	40	5	70.6, 70.7, 70.8, 70.85, 71.5' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 10 1/8" open	□	No Recovery 70.3-70.5' Limestone 70.5-74.1' - light olive gray mottled with olive gray, (5Y 5/2 with 5Y 3/2), mild to moderate HCl reaction, strong (R4), extremely weak rock at top of sample, 1/16" voids on 10-15% of surface, poorly fossiliferous, casts up to 1/2"	R7: 10 minutes
			2	71.2' - Fracture, 50 deg, rough, undulating, tight			
			2	71.7' - Fracture, 30-40 deg, rough, undulating, carbonate silt infill over 100% surface 1/16" thick			
			1	72.1' - Fracture or mechanical break, horizontal, up to 3/8" open			
			NR	72.8' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4"			
	73.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
80 -37.5	R9-NQ 5 ft 80%	62	>10 1 3 2 NR	73.9' - Fracture, 70-80 deg, rough, undulating, tight 75.5-75.85' - Fracture zone, rock fragments 3/4", sub-angular, some granular mineralization on surface 77.1' - Fracture, 15-20 deg, rough, undulating, tight, black stains on 90% of surface 77.6, 77.7, 77.9' - Fracture, horizontal, rough, undulating, open up to 1/4" 78.4-78.5' - Fracture zone, rough, undulating, 1/16"-1/32" thick infill of very soft carbonate fines	|	Limestone 75.5-79.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), black mottling, strong HCl reaction, strong (R4), 1/8" spheroidal voids on 10-15% of surface, poorly fossiliferous (casts up to 5/16"), trace cavities up to 1" elongate and horizontally aligned, no infill in voids or cavities, black 1/16" horizontal laminations, vertical stress joints near 79', fractures with secondary black mineralization infill near 77.2' No Recovery 79.5-80.5'	T. Stewart/A. Bonilla are the loggers SC-2 collected at 78.5-79.5' R9: 15 minutes Driller's Remark: Will set 3" NW casing from 45.5-75.5' below ground surface Start R-10 at 11:36, observed 50-60% core loss
85 -42.5	R10-NQ 5 ft 100%	82	2 4 2 0 1	80.85' - Bedding plane or fracture, 0-5 deg, rough, undulating, brownish black stains over 100% surface, open 1/4" 81.35, 81.55, 81.65, 81.8' - Bedding plane or mechanical break, horizontal, rough, planar, open up to 1/8" 82.0, 82.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight to 1/4" open 82.8' - Bedding plane or mechanical break, horizontal, rough, undulating, organic layers <1/16" thick, apparent weathering 83.2' - Mechanical break, tight 84.4' - Fracture, 80-90 deg, rough, undulating, tight	|	Limestone 80.5-85.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, medium strong (R3), weathered, spheroidal 1/8" voids up to 30% of surface, poorly fossiliferous (casts up to 1/2"), some secondary mineral infill (yellowish gray 5Y 8/1 in color), trace coarse grained sized black particles (organics)	R10: 8 minutes Add 1/4 bag bentonite to mud vat
90 -47.5	R11-NQ 5 ft 100%	85	0 0 3 0 0	85.45, 85.6' - Fracture (2), 50-60 deg, rough, undulating 87.6' - Bedding plane, horizontal, rough, undulating, brownish black infill 1/16" thick over 85% of surface 87.75' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/16"-1/8" 88.0, 88.15' - Fracture (2), horizontal, rough, undulating, 1/8"-1" open 88.95, 89.5' - Mechanical break (2), tight	|	85.5-90.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), spheroidal 1/8" voids up to 15-20% of surface, moderately fossiliferous (mostly casts of echinoderma up to 5/8", white whole fossils and fragments up to 3/4" in size over bottom 89.5-90.5', 3-7% medium to coarse grained black fragments (organics) also as 3/8" long discontinuous laminations less than 3/8" thick, also spiral and conical shaped casts up to 3/16"	R11: 6 minutes SC-3 collected at 89.5-90.5' 14:12 Mix 1/8 bag mud to vat
95 -52.5	R12-NQ 5 ft 100%	87	0 1 1 3 >10	91.65' - Bedding plane or mechanical break, rough, undulating, tight 92.55' - Mechanical break, 3-5 deg, rough, undulating, tight 93.0' - Bedding plane, horizontal, smooth, planar, tight, possibly organic layer 93.6' - Fracture, 10-20 deg, rough, undulating, 1/8" open 93.85, 94.3' - Fracture, 50-60 deg, rough, undulating, tight	|	90.5-95.5' - yellowish gray with yellowish gray bedding, (5Y 8/1 with 5Y 7/2), silt-sized black particles, 1/16" voids on 20-25% of surface, highly fossiliferous toward bottom 1/3 of sample (casts and whole fossils) microforams and fossil fragments range from medium to coarse sand-sized particles, oval shaped fossils approximately 1/8", spiral shaped fossils	R12: 15 minutes



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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100 -57.5	R13-NQ 5 ft 100%	43	3	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	[Symbolic Log]	Limestone 95.5-100.5' - yellowish gray (5Y 7/2), strong HCl 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)	T. Stewart is the logger. R13: 6 minutes
			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				
105 -62.5	R14-NQ 5 ft 94%	82	0	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	[Symbolic Log]	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	Driller's Remark: Will set 3" NW casing (25' more) Last core run on 4/22/07 R14: 8 minutes
			2				
			1				
			0				
110 -67.5	R15-NQ 5 ft 98%	82	>10	105.5-106.1' - Fracture zone, fragments up to 2"	[Symbolic Log]	No Recovery 105.2-105.5' Limestone 105.5-110.4' - yellowish gray, (5Y 7/2), very fine grained, strong HCl 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 grained (shell fragments) angular white particles	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
			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"			
115 -72.5	R16-NQ 5 ft 100%	97	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"	[Symbolic Log]	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'	R15: 10 minutes R16: 10 minutes
			2				
			1				
			0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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) 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
120 -77.5	R17-NQ 5 ft 100%	40	0 >10 >10	116.55, 116.7' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to open 1/4" 116.55-117.3' - Fracture zone 118.15-118.45' - Fracture zone 118.5, 118.65, 118.8, 188.95, 119.2' - Bedding plane or mechanical break (5), horizontal, rough, undulating, tight to open 1/4" 119.45' - Fractures (2), horizontal and vertical, rough, undulating, perpendicular, tight	[Symbolic Log]	Limestone 115.5-120.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to extremely weak (R1 to R0), very fossiliferous (casts, molds, microforams), trace cavities with medium dark gray infill up to 1-1/4", 25-35% medium to coarse grained medium dark gray particles in rock matrix, gray mottling in matrix at 119.0'	SC-4 collected at 115.5-116.55' R17: 9 minutes
125 -82.5	R18-NQ 5 ft 90%	70	NR 1 1 1 6 0	119.6, 119.8' - Bedding plane or mechanical break (2), 0-5 deg, rough, planar, tight 121.2' - Bedding plane, horizontal, cohesive silt infill on surface, 1/4" thick 121.8, 122.8' - Mechanical break (2), tight 123.2' - Bedding plane or mechanical break, 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 break (8), horizontal, rough, planar, tight, dark surfaces, possibly bedding plane of dark material	[Symbolic Log]	No Recovery 120.5-121.0' Carbonate Silt With Silica Sand (ML) 121.0-121.2' - grayish yellow, (5Y 7/2), wet, strong HCl reaction, 15-25% very fine to fine grained, clear, subrounded, silica sands, 3-7% very fine to fine grained dark yellowish orange (10YR 6/6) and light brown (5YR 5/6) particles Limestone 121.2-125.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very fossiliferous (microforams, fossil casts and molds), thinly bedded near 123.5-124.0' with olive gray staining, organic odor from crumbled rock, friable from 121.2' to 123.0', trace cavities up to 3/4" some with white mineralization as 50% infill (rimmed), medium dark gray medium to coarse grained on 25-35% of rock matrix 125.5-130.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), voids (<1/16") over 15-20% (mostly over top 3'), 1/16"x3/16" elongated trace cavities horizontally aligned, cavities in lower 2' have white secondary mineralization rimming the outside of the void/cavity, medium dark gray particles up to 10% of rock matrix, trace medium gray cavities up to 3/4" and to trace medium grained black particles/organics throughout entire run; R-19 is highly fossiliferous (microforams and casts/molds)	9:25 Add 1/4 bag bentonite after emptying mud vat and refilling R18: 13 minutes
130 -87.5	R19-NQ 5 ft 100%	77	1 2 5 1 >10	126.4, 127.05' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight to 1/4" open 127.5-127.65' - Fracture zone, rock fragments 128.0-128.15' - Fracture zone, angular rock fragments, 1/2"-5/8" 128.25, 128.35, 129.0' - Fracture (3), horizontal and vertical, rough, undulating, open up to 3/4", cavity infilled with gray material at 129' 129.35' - Bedding plane, 10-15 deg, open 3/4"	[Symbolic Log]		R19: 10 minutes
135 -92.5	R20-NQ 5 ft 98%	65	6 4 1 5 2	130.0-130.5' - Fracture zone, vertical 130.55' - Mechanical break or bedding plane, horizontal, smooth, undulating, open 1/8" 131.0' - Mechanical break or bedding plane, horizontal, rough, undulating 131.3, 131.35, 131.4, 131.5, 131.6, 131.65, 131.7, 131.8' - Bedding plane or mechanical break (8), horizontal, rough, undulating, open 1/8" 132.1, 133.0' - Mechanical break (2), tight 132.55' - Bedding plane or mechanical break, horizontal, rough, planar 133.0' - Mechanical break, tight	[Symbolic Log]		R20: 11 minutes



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
140 -97.5	R21-NQ 5 ft 94%	72	NR	1	133.6' - Bedding plane, 0-5 deg, rough, undulating, tight	Limestone 130.5-133.65' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), grades from a very lightly fossiliferous (microforams, molds) to a thinly bedded and laminated very fine grained limestone. 130.5-133.65': echinoid and microform rich, trace elongated cavities rimmed with white hard mineralization 3/8"x1/8", up to 25% medium grained medium dark gray (N4) particles in matrix; very fine grained wavy thinly bedded discontinuity at 133.65' 133.65-135.4' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), thinly bedded to laminated and alternating beds, wavy thinly bedded discontinuity at 135.2' (load structures) interval, microforams, medium dark gray (N4) particles as above No Recovery 135.4-135.5' Limestone 135.5-139.2' - yellowish gray to yellowish gray, (5Y 7/2 to 5Y 8/1), very fine grained, strong HCl reaction, medium dark gray (N4) particles on 15-20% of surface, trace olive gray (5Y 3/2) laminations and wavy bedded discontinuities at 137.5' 139.2-140.2' - strong HCl reaction, strong (R4), white with yellowish gray (5Y 8/1) cavity infilling, 1-1/2" irregularly shaped cavities, poorly fossiliferous (casts-spiral shaped up to 3/4" length), trace medium grained black particles (organics) No Recovery 140.2-140.5' Limestone 140.5-143.1' - Same as 139.2-140.2' except mottled light gray (N7) over 40% of run, trace organics as wavy laminations 3/16", 1/16" spheroidal voids infilled 10-15% 143.1-145.5' - yellowish gray, (5Y 7/2), strong HCl reaction, strong (R4), bedded, up to 1/8" voids up to 25% of surface (may be microforams as casts), trace casts of echinoderm fragments, wavy laminations 145.5-149.0' - yellowish gray, (5Y 7/2), strong HCl reaction, medium grained texture, 5-10% elongated cavities (up to 3/4"x1/8") horizontally aligned and infilled with hard medium to light gray (N6) mineral, trace voids 1/8"x1/16" rimmed with white mineral	SC-5 collected at 138-138.85' R21: 10 minutes Driller's Remark: 139.5' Started losing water rapidly SC-6 collected at 143.1-143.9' Driller's Remark: 50-75% circulation loss R22: 8 minutes R23: 8 minutes R24: 7 minutes	
			1	134.1, 134.35, 134.45, 134.5, 134.8' - Bedding plane (5), horizontal, rough, planar, open 1/16"				
			1	134.6' - Bedding plane, 0-5 deg, rough, undulating, open to 1/16"				
			1	135.75' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"				
			1	137.1' - Fracture, 70 deg, rough, undulating, tight				
	145 -102.5	R22-NQ 5 ft 100%	80	>10	138.0' - Bedding plane or mechanical break, horizontal, rough, planar, tight			
				NR	138.85' - Mechanical break			
				>10	139.2' - Bedding plane or mechanical break, horizontal, rough, planar, top of fractured zone, 2" open			
				2	139.5' - Fracture, vertical, rough, undulating 139.65-139.9' - Fracture zone, subrounded 1/2"- 1-1/8" fragments, black stains over 80% of surface			
				2	139.95' - Fracture, 70-80 deg, rough, undulating, black stains over 25% of surface, tight			
150 -107.5	R23-NQ 5 ft 100%	100	1	140.15-141.25' - Fracture zone, brownish black staining on fragments, possibly weathered				
			1	142.1' - Bedding plane, 10 deg, smooth, undulating, organic layer, 1/16"				
			1	142.4-142.5' - Fracture zone, brownish black stains over 40% surface				
			1	143.1' - Bedding plane, horizontal, rough, undulating, brownish black stains over 80% surface, 1/16" open				
			0	143.9' - Bedding plane, 0-5 deg, rough, stepped, tight				
	155 -112.5	R24-NQ 5 ft 96%	38	0	145.2' - Bedding plane or mechanical break, 0-9 deg, rough, undulating, 1/4"			
				2	146.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
				2	148.0, 148.35, 148.5' - Mechanical break, tight			
				1	148.9' - Bedding plane, horizontal, 3/8" infill			
				1	149.0' - Bedding plane, 0-10 deg, rough, undulating, tight to 1/4" open			
155 -112.5	R24-NQ 5 ft 96%	38	3	150.0' - Fracture, 60 deg, rough, undulating, tight				
			4	150.7' - Fracture, 70 deg, rough, undulating, tight				
			4	141.4, 151.5' - Bedding plane (2), horizontal, rough, planar, tight				
			1	151.65' - Bedding plane, horizontal, rough, planar, open 3/4", infill of soft fines				
			4	152.15, 152.45' - Bedding plane (2), horizontal and 5 deg, rough, undulating, open 1/16"-3/8", silt infill at 152.15				
155 -112.5	R24-NQ 5 ft 96%	38	4	152.75' - Fracture, horizontal, rough, undulating, tight to open 1/4"				
			5	153.6-154.95' - Bedding plane (9), horizontal, rough, undulating to planar, 1/16"-1/4" open				



PROJECT NUMBER: 338884.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, 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -117.5	R25-NQ 5 ft 64%	0	NR		Limestone 149.0-150.5' - light olive gray, (5Y 5/2), strong HCl reaction, medium strong to strong (R3 to R4), 1/16" voids on 5-10% of surface, trace cavities up to 3/16"x3/16" with grayish yellow (5Y 8/1) infill, poorly fossiliferous (casts up to 3/8") 150.5-153.6' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), dusky yellowish brown (10YR 2/2) wavy laminations, trace of medium grained organics in laminations 153.6-155.3' - light olive gray, (5Y 5/2), strong HCl reaction, medium strong to very weak (R3 to R1), very fossiliferous (microforams), very similar to 145.5-149.0', medium to coarse grained plate-like angular fragments, yellowish gray (5Y 8/1) in color No Recovery 155.3-157.3' Poorly Graded Silica Sand (SP) 157.3-159.9' - loose, fine grained, mild to moderate HCl reaction, clear, subrounded sands with trace carbonate fines, matrix of fines are very pale orange (10YR 8/2), trace light brown (5Y 5/6) and black particles (sum of fines is up to 5%), this sand grades to siltier with depth	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	
165 -122.5	R26-NQ 5 ft 93%	57	NA			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	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
170 -127.5	R27-NQ 5 ft 100%	75	NR		165.77' - Fracture, horizontal, rough, planar, tight 165.98' - Fracture, horizontal, rough, undulating, open 166.8' - Fracture, <5 deg, rough, stepped, 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 170.05' - Fracture, horizontal, rough, undulating, open 170.7' - 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 171.5' - Fracture, 40 deg, rough, stepped, tight 172.2' - Fracture, 60 deg, rough, undulating, tight, length is from 172.0-172.9'	R27: 8 minutes	
175 -132.5	R28-NQ 5 ft 98%	54	NR		160.5-162.2' - yellowish gray, fine grained, strong HCl reaction, voids absent to 161.3', 1/16" voids from 161.3' to 161.8' on 5%-10% of surface, fossils casts/molds 162.2-165.15' - dusky yellow, (5Y 6/4), fine to very fine grained, mild to moderate HCl reaction, weak (R2), becoming (R2) weak rock from approximately 163.5' to 164.5', voids variable over interval from 15-20% to <1% in some intervals (especially R2 rock), fractures in 163.7-164.2' interval, trace organic laminae at 163.2'	R28: 7 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-11	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
180 -137.5	R29-NQ 5 ft 94%	51	NR 2 1 10 >10 >10 NR	173.15' - Fracture, horizontal, smooth, undulating, open 173.7' - Fracture, <5 deg, smooth, stepped, tight 174.08, 174.2, 174.35, 164.55' - Fracture (4), horizontal, smooth, planar, tight (open at 174.35) 174.7' - Fracture, horizontal, smooth, planar, open, <1/16" thick brown clay over 100% of surface 175.1' - Fracture, <5 deg, rough, stepped, open 175.6' - Fracture, <5 deg, smooth, stepped, open, dark brown to black stain over 95%-100% surface 176.1' - Fracture, horizontal, rough, stepped, open	No Recovery 165.15-165.5' Limestone 165.5-166.1' - moderate olive brown, (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 (nodules/intraclasts), trace fossil molds and casts 166.1-166.8' - yellowish gray to very 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 common 166.8-170.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to very fine grained, moderate to strong HCl reaction, becoming stronger with depth (up to R2), voids up to 1/16" on 15-25% of surface with some zones of very fine grained limestone with 0% voids, cavities rare, laminated from 167.6-167.8' (very weak rock [R1]), some brownish gray to light gray mottling especially from 168.7-169.3' 170.5-175.1' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), moderate to strong HCl reaction, voids up to 1/16" over 10-15% of surface, 3/8"x3/16" cavities, trace fossil molds/casts, laminated at 171.0', fine grained with occasional thin beds of very fine grained limestone with few voids especially near base of interval 175.1-175.4' - dusky yellow, (5Y 6/4), strong HCl reaction, laminated with black organic laminae, minimum voids and cavities covering 50-60% of surface No Recovery 175.4-175.5' Limestone 175.5-180.2' - variegated dusky 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 limestone especially from 176.8-177.8', voids (1/16") common in fine grained material up to 15-20% 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 rock from 177.9-180.2' with black carbonaceous material No Recovery 180.2-180.5'	R29: 6 minutes	
185 -142.5	R30-NQ 5 ft 100%	46	1 3 2 4 3	177.1' - Fracture, horizontal, smooth, planar, tight 177.6, 177.7, 177.82' - Fracture (3), horizontal and <10 deg, smooth, planar, tight 177.9' - Fracture, 0-40 deg, smooth, stepped, open, dark brown/black stain over 40% 178.1-178.4' - Fracture zone, 0-60 deg, rough, undulating, open 178.55' - Fracture, <5 deg, smooth, undulating, open 179.17' - Fracture, horizontal, rough, stepped, open 179.25-181.2' - Fracture zone, rough to smooth, planar to undulating, open to tight 180.8' - Fracture, <5 deg, rough, stepped, open		R30: 9 minutes	
190 -147.5	R31-NQ 5 ft 99%	62	4 7 0 1 5	181.8, 181.87' - Fracture (2), horizontal, smooth, planar, open 182.0' - Fracture, 0-90 deg, smooth, undulating, tight 182.6' - Fracture, <5 deg, rough, undulating, open 182.95' - Fracture, 40 deg, rough, undulating to stepped, tight 183.65, 184.4, 186.4' - Fracture (3), horizontal, rough, undulating, open 183.8' - Fracture, 0-<5 deg, smooth, planar to stepped, open	R31: 8 minutes		
195 -152.5	R32-NQ 5 ft 90%	40	NR 4 3 2 4 >10 NR	184.17' - Fracture, horizontal, smooth, planar, tight 184.93, 185.2' - Fracture, rough, undulating, tight 185.25' - Fracture, 40-50 deg, rough, undulating, tight 185.95, 186.0' - Fracture, horizontal, smooth, open 186-186.4' - Fracture, vertical, rough, undulating, tight 186.4' - Fracture, horizontal, rough, undulating, open 186.6, 186.7' - Fracture, <5 deg, rough, undulating, open 186.95' - Fracture, <5 deg, rough, stepped, open	End drilling on 5/8/07 Water level 3.5' below ground surface on 5/9/07 Begin drilling at 190.5' on 5/9/07 SC-8 collected at 191.15-192' R32: 6 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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) 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

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



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.5	R37-NQ 5 ft 52%	8	>10		Limestone 195.5-197.5' - yellowish gray, (5Y 7/2), mild HCl reaction, void and cavities up to 3/4" to 1-1/16"x1-3/16" to 3/4" on 20-30% of surface, voids and cavities less common with depth, fossiliferous (molds and casts), some thin carbonaceous laminae 197.5-200.5' - yellowish gray, (5Y 7/2), very fine grained, very weak to weak (R1 to R2), 1/16" variable voids on 0-10% of surface, cavities rare (3/16"x3/16"), trace fossil molds/casts, very carbonaceous at 199.75-199.8' with thin occasional black laminae below 200.5-200.67' - very similar to 197.5-200.5', "chalky" with dark brown carbonaceous layers 200.67-202.8' - yellowish gray, (5Y 7/2), mild HCl reaction, voids and cavities covering 80-90% surface up to several inches up to 3/4"-1-3/16", medium grained fossiliferous molds and casts conglomeratic from 201.7-202.0' 202.8-203.5' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, with laminae, 1/16" voids over <1% of surface area No Recovery 203.5-205.5' Limestone 205.5-207.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, voids variable from <1% to over 50%-60% of surface, very fine grained rock contains <1-5% voids No Recovery 207.0-210.5' Limestone 210.5-211.4' - yellowish gray, (5Y 7/2), mild to no HCl reaction, voids up to 1/16" on 35-40% of surface, few 3/8"- 3/4"x3/8" cavities, trace fossils as voids/casts, very fine to fine grained, becoming very fine grained at bottom 0.1', little to no voids, no fossils, medium strong (R3) rock 211.4-212.0' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, laminated with black carbonaceous/organic material, thin vertical fracture extends from 211.4-211.5'	R. McComb is the logger. 218' circulation 100% loss R37: 4 minutes	
225 -182.5	R38-NQ 5 ft 15%	0	3			211.65' - Fracture, horizontal, smooth, undulating, tight 211.8' - Fracture, horizontal, smooth, planar, tight 212.3' - Fracture, horizontal, rough, undulating, open 212.5-212.7 and 212.85-212.95' - Fracture zone, <5 deg, rough, undulating, open 213.4' - Fracture, <5-70 deg, rough, undulating, open 213.55' - Fracture, <5-90 deg, rough, undulating, open, black staining on 85-90% of surface 215.5-215.75' - Fracture zone, various fracture orientations, gravel-sized fragments, open 215.75' - Fracture, 0-<5 deg, rough, stepped, open 216.15' - Fracture, 0-40 deg, rough, undulating, open 216.15-217.1' - Fracture zone, horizontal, rough to smooth, planar to undulating, open 217.1' - Fracture, <5 deg, rough, undulating, open 217.3' - Fracture, 30 deg, rough, undulating, tight 217.6-218.1' - Fracture zone, <5-70 deg, rough, undulating, open 220.6' - Fracture, <5-30 deg, rough, stepped, open 220.95, 221.2' - Fracture, <5 deg, rough, undulating, open 225.5-228.0' - Fracture zone, 0-90 deg, rough to smooth, undulating, open	R38: 4 minutes 226' Regain approximately 20% circulation
230 -187.5	R39-NQ 5 ft 50%	0	>10			220.95, 221.2' - Fracture, <5 deg, rough, undulating, open 225.5-228.0' - Fracture zone, 0-90 deg, rough to smooth, undulating, open 230.5-231.0' - Fracture zone, rock fragments	R39: 3 minutes
235 -192.5	R40-NQ 5 ft 10%	0	>10				R40: 3 minutes



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -197.5	R41-NQ 5 ft 0%	0	NR		212.0-212.7' - yellowish gray, (5Y 7/2), fine grained, friable, becoming coarser grained with depth, voids/cavities up to 3/8"-3/4"x1-3/8"-3/4", voids over 30-40% of surface, very weak rock (R1) Limestone 212.7-213.7' - very similar to 210.5-211.4', fine to very fine grained, fossil molds/casts common, becoming very fine grained at bottom 0.1' with little to no voids, no fossils, approaching medium strong (R3) No Recovery 213.7-215.5' Limestone 215.5-217.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, very fine grained (chalk-like), becoming laminated with depth (black to dark gray carbonaceous/organic laminae), voids and cavities were common from 216.6-217.0'; voids over 0-1% above grading to 5-10% with depth, cavities few, 3/8"x3/16", with fossil molds/casts becoming more common with depth, microfractures (healed) abundant in upper 0.6' 217.0-218.1' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, voids and cavities common (up to several centimeters), fossiliferous (molds/casts) and worm burrows (unfilled-open), gastropods, forams No Recovery 218.1-220.5' Limestone 220.5-221.25' - yellowish gray to very light gray, (5Y 7/2 to N8), moderate HCl reaction, 1/16" voids on 10-15% of surface, cavities (up to several centimeters), fossiliferous (casts/molds) becoming less common with depth, "chalk-like" texture No Recovery 221.25-225.5' Limestone 225.5-228.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), becoming more friable with depth, rock strength decreases with depth, voids/cavities over 30-40% of surface, fossiliferous casts/molds, occasionally laminated No Recovery 228.0-230.5'	R41: 2 minutes	
245 -202.5	R42-NQ 5 ft 0%	0	NR			R42: 2 minutes	
250 -207.5	R43-NQ 5 ft 0%	0	NR			No special cores have been pulled since SC-8 because RQDs <0.8' (for a continuous length)	
255 -212.5	R44-NQ 5 ft 8%	0	NR		250.5-250.9' - Fracture zone, gravel-sized rock fragments	R43: 3 minutes	
						R44: 5 minutes	



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
260 -217.5	R45-NQ 5 ft 34%	0	>10	255.5-256.1' - Fracture zone, gravel-sized rock fragments 256.1' - Fracture, <5-50 deg, rough, stepped, open 256.3, 256.5' - Fracture (2), 0-60 deg, rough, stepped to undulating, open 256.5-256.7' - Fracture, vertical, rough, stepped, open 256.7' - Fracture (2), <5-60 deg, rough, stepped 256.7-257.2' - Fracture zone, open, sand to gravel-size rock fragments		Limestone 230.5-231.0' - yellowish brown, (5YR 7/2), no to mild HCl reaction, gravel-sized fragments, cavities and voids on 30-40% of surface, voids up to 3/16"x3/8", fossil voids/casts common No Recovery 231.0-250.5' Limestone 250.5-250.9' - yellowish gray, (5Y 7/2), mild HCl reaction, fossiliferous (casts/molds), voids (<1/16") covering 80-90% of surface No Recovery 250.9-255.5' Limestone 255.5-256.1' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong HCl reaction, voids on 20-30% of surface, rare voids in very fine grained limestone, some fossil molds and casts 256.1-257.2' - yellowish gray, (5Y 7/2), moderate to mild HCl reaction, extremely weak (R0), friable becoming gravel to sand-sized limestone fragments with depth, voids over 40-50% of surface No Recovery 257.2-260.5' Limestone 260.5-261.8' - yellowish gray, (5Y 7/2), laminated from 260.5-261.0', some bluish gray banding at 261.5-261.6'; very weak (R1) to extremely weak (R0), voids and cavities rare in upper laminated section becoming common with depth, some fossil casts/molds No Recovery 261.8-265.5' Limestone 265.5-265.9' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, very weak (R1), voids and few cavities, very fine grained limestone containing few <5% voids, cavities 3/8"x3/16", trace fossil voids/casts No Recovery 265.9-270.5' Limestone 270.5-271.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, gravel-sized limestone to 271.25', voids and cavities becoming more common with depth, sparse through upper part of interval	R45: 6 minutes	
265 -222.5	R46-NQ 5 ft 26%	0	>10	260.5-261.35' - Fracture zone, horizontal and vertical, rough, undulating to stepped, open 261.5' - Fracture, <5 deg, rough, stepped, open 261.55' - Fracture, 20 deg, rough, stepped, open 261.7' - Fracture, 20 deg, rough, undulating to stepped			R46: 5 minutes	
270 -227.5	R47-NQ 5 ft 8%	0	10	265.5-265.7' - Fracture zone, rock fragments 265.7' - Fracture, horizontal, rough, undulating, open 265.8' - Fracture, <5 deg, rough, undulating, tight			R47: 3 minutes	
275 -232.5	R48-NQ 5 ft 70%	0	>10	270.5-271.25' - Fracture zone, variable fracture orientation 271.25' - Fracture, 40 deg, smooth, planar, open 271.75' - Fracture, horizontal, smooth, undulating to planar, open 272.0' - Fracture, 10 deg, smooth, planar, tight 272.18' - Fracture, 40 deg, smooth, stepped, loose, conical in shape 272.35' - Fracture, horizontal, smooth, stepped, tight 272.5, 272.62, 272.73, 272.95, 273.03' - Fracture (5), horizontal, smooth, planar, open			R48: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
280 -237.5	R49-NQ 5 ft 26%	0	NR	<p>273.18-273.6' - Fracture zone, variable fracture orientations, limestone gravel</p> <p>273.6' - Fracture, horizontal, smooth, undulating, tight</p> <p>273.8' - Fracture, <5 deg, rough, stepped</p> <p>273.8-274.0' - Fracture zone, various fracture angles, rock fragments</p> <p>275.5-275.95' - Fracture zone, variable fracture orientation, rock fragments</p> <p>275.95' - Fracture, <5 deg, rough, stepped, open</p> <p>276.3' - Fracture, <5 deg, rough, undulating, open</p> <p>276.3-276.8' - Fracture zone, smooth to rough, planar to undulating, variable fracture orientation, rock fragments</p>	<p>Limestone</p> <p>271.9-274.0' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, becoming stronger at 273.6-273.8' (R2) and returning to very weak rock below 273.8', very fine grained (chalky), voids covering 5-10% of surface, laminated in upper 0.5-0.7', trace cavities (3/8"x3/8"), trace fossil molds/casts, gravelly and blue with some black carbonaceous/organic material</p> <p>No Recovery 274.0-275.5'</p> <p>Limestone</p> <p>275.5-276.8' - yellowish gray to very light gray, (5Y 7/2 to N8), fine to very fine grained, mild to strong HCl reaction, light gray thin bed at 276.55', voids and cavities common up to 3/8"-3/4"x3/16"-3/8", voids and cavities on 40-50% of surface, rock (except for N8 limestone where voids are absent), fossil casts/molds, strong HCl reaction for very fine grained N8 rock</p> <p>No Recovery 276.8-280.5'</p> <p>Limestone</p> <p>280.5-282.75' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, voids and cavities common over 60-70% rock with occasional intraclastic limestone rock fragments (darker gray) with cavity infilling, cavities 3/8"-3/4" to 3/16"-3/8", fossiliferous (molds and casts)</p> <p>282.75-283.7' - variegated pale blue to yellowish gray, (5PB 7/2 to 5Y 7/2), fine to medium grained, mild to moderate HCl reaction, becoming laminated with depth, fossil casts/molds common in upper 0.3' (gastropods), voids and cavities present (up to several centimeters)</p> <p>No Recovery 283.7-285.5'</p> <p>Bottom of Boring at 285.5 ft bgs on 5/9/2007</p>	R49: 4 minutes	
285 -242.5	R50-NQ 5 ft 64%	0	NR	<p>280.5' - Fracture, <5 deg, rough, stepped, open</p> <p>280.5-281.8' - Fracture zone, numerous fractures, some vertical</p> <p>282.2' - Fracture, <5-40 deg, rough, stepped, open</p> <p>282.75-283.15' - Fracture zone, 10 deg, rough, planar, tight</p> <p>282.75' - Fracture, <5 deg, rough, undulating, open</p> <p>283.15' - Fracture, <5-90 deg, rough, stepped, open</p> <p>283.33' - Fracture, 20 deg, rough, stepped, tight</p>	<p>R50: 3 minutes</p>		
						Total Depth is 285.5', no special cores since SC-8, no lengths >0.8'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 1 OF 10
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
 WATER LEVELS : 5.3 ft bgs on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.1	0.0	1.0	SS-1	1-2-2 (4)	<p>Poorly Graded Sand (SP) 0.0-0.8' - light gray, (N7), moist, very loose, very fine to fine grained, trace nonplastic fines, black (N1) organic bed with plant roots at 0.2-0.3', sand is silica</p> <p>Silty Sand (SM) 0.8-1.0' - moderate brown, (5YR 4/4), moist, very loose, very fine to fine grained, approximately 20% nonplastic fines, gradational contact with overlying material, sand is silica</p>		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08) 15:45 on 5/2/07 preparing to drill
5 37.1	1.5						
	5.0	1.3	SS-2	4-4-4 (8)	<p>Silty Sand (SM) 5.0-5.5' - yellowish gray, (5YR 7/2), wet, loose, very fine to fine grained, grading more silty with depth, approximately 46% nonplastic fines, sand is silica</p> <p>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</p>		Water table about 5' below ground surface
	6.5						
10 32.1	10.0	1.1	SS-3	20-29-50 (79)	<p>Silt (ML) 10.0-11.1' - grayish orange, (10YR 7/4), wet to moist, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 10-15% very fine grained sand, all carbonate</p>		
	11.5						
15 27.1	15.0	0.0	SS-4	50/3.5 (50/3.5")	No Recovery 15.0-15.3'		
	15.3						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 2 OF 10
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
 WATER LEVELS : 5.3 ft bgs on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
22.1	20.0	1.0	SS-5	24-21-22 (43)	Silty Sand With Limestone (SM) 20.0-21.0' - grayish orange, (10YR 7/4), wet, dense, fine to coarse grained, moderate HCl reaction, 24% nonplastic fines, 30% fine to coarse gravel sized (up to 1"), fragments are very porous and fossiliferous, all carbonate		
	21.5						
25	25.0	0.7	SS-6	12-50/4.5 (62/10.5")	Silty Sand (SM) 25.0-25.7' - Same as 20.0-21.0' except 25-30% nonplastic fines, 25% fine gravel sized		Driller's Remark: Soft at 28.5'
17.1	25.9						
30	30.0	1.0	SS-7	20-11-15 (26)	Silty Sand With Gravel (SM) 30.0-31.0' - Same as 20.0-21.0' except dark yellowish orange, medium dense		Driller's Remark: Harder at 32.5'
12.1	31.5						
35	35.0	0.0	SS-8	50/1 (50/1")	No Recovery 35.0-35.1' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Switch to NQ at 35'
7.1	35.1						
40							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.3 ft bgs on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
7.1	35.0	50	2	35.4' - Fracture, <5 deg, rough, stepped, open	Limestone 35.0-39.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1), becoming extremely weak (R0) and friable at 38.9-39.3', fossiliferous (molds and casts) with voids covering 50-60%, cavities >5 up to 3/8"-3/4"x3/16", mottled, less voids through extremely weak rock zone No Recovery 39.9-40.0' Limestone 40.0-43.2' - Same as 35.0-39.9' except with interbeds of very weak to extremely weak (R1 to R0) rock at 40.5-41.3' No Recovery 43.2-45.0'	HW casing set at 35' R1: 6 minutes	
	R1-NQ 5 ft 98%		3	35.6' - Fracture, 0-40 deg, rough, stepped, tight			
			0	36.05' - Fracture, 40-70 deg, rough, stepped, approximately 0.3-0.4' long, open to tight			
			1	36.2' - Fracture, 40-70 deg, rough, stepped, approximately 0.3-0.4' long, open to tight			
			3	36.8' - Fracture, 30 deg, rough, undulating, tight			
			NR	38.2' - Fracture, 70 deg, rough, undulating, tight			
40	40.0	8	0	39.05, 39.25, 39.5' - Fractures (3), <5-90 deg, rough, stepped, tight to open	Limestone 45.0-48.4' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1), fossiliferous (casts/molds), voids typically up to 1/16" over 40-50%, cavities (>5) up to 1-3/16"-1-9/16"x3/8" (fossil casts), cavities more common from 45.0-46.0' No Recovery 48.4-50.0'	Driller's Remark: Very soft drilling at 43.5' R2: 3 minutes	
2.1	R2-NQ 5 ft 64%		2	41.65' - Fracture, 60 deg, rough, stepped, open			
			>10	41.9' - Fracture, 40-60 deg, rough, stepped, open			
			NR	42.3-42.9' - Fracture zone, <5-90 deg, rough, stepped to undulating, open			
45	45.0	47	>2	45.0-45.3' - Fracture zone, <5-90 deg, rough, stepped, open	Limestone 50.0-54.2' - Same as 45.0-48.4' except becoming mottled with brownish gray patches of irregularly distributed finer grained limestone No Recovery 54.2-55.0'	R3: 3 minutes SC-1 collected at 52.75-53.75' R4: 4 minutes	
-2.9	R3-NQ 5 ft 68%		1	45.65' - Fracture, horizontal, rough, undulating, tight			
			3	46.3' - Fracture, horizontal, rough, undulating, open			
			NR	47.7' - Fracture, 10 deg, rough, planar, tight			
			NR	47.8' - Fracture, 60 deg, rough, planar, tight			
50	50.0	68	10	47.9' - Fracture, <5 deg, rough, undulating, open	Limestone 50.0-54.2' - Same as 45.0-48.4' except becoming mottled with brownish gray patches of irregularly distributed finer grained limestone No Recovery 54.2-55.0'	R3: 3 minutes SC-1 collected at 52.75-53.75' R4: 4 minutes	
-7.9	R4-NQ 5 ft 84%		1	48.0' - Fracture, 40 deg, rough, planar, open			
			2	48.2' - Fracture, <5 deg, rough, undulating, open			
			1	48.25' - Fracture, 80-90 deg, rough, undulating, tight			
55	55.0		NR	50.4-51.1' - Fracture zone, 0-90 deg, rough, undulating to stepped, open to tight			
				51.9' - Fracture, 20-30 deg, rough, undulating, tight			
				52.1' - Fracture, rough, undulating, tight			
				52.7' - Fracture, 30 deg, rough, stepped to undulating, tight, very soft on either side of fracture			
				53.7' - Fracture, 40 deg, rough, stepped, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 4 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-12.9	R5-NQ 5 ft 96%	64	10	55.0-55.6' - Fracture zone, 0-90 deg, rough, undulating to stepped, open to tight	Limestone 55.0-59.8' - Same as 50.0-54.2' 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) with thin friable zone of extremely weak rock (R0), adjacent to some fracture traces No Recovery 59.8-60.0' Limestone 60.0-61.5' - Same as 55.0-59.8' 61.5-62.3' - moderate yellowish brown, (10YR 5/4), mild to no HCl reaction, extremely weak to very weak (R0 to R1), cavities <1-3%, fossils (casts/molds) absent, thinly laminated, mottled. 62.3-64.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, weak to medium strong (R2 to R3), voids up to 1/16" over 5-10%, few cavities up to 3/16"x3/16", trace fossil molds/casts. 64.0-64.8' - Same as 62.3-64.0' except very weak (R1), thinly laminated at 64.2' (possible organics), trace fine grained stronger rock No Recovery 64.8-65.0' Limestone 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 (generally 1/16" or less) over 10-30%, more dense at 65.0-66.0' and 68.5-69.35', cavities more abundant in same two intervals up to 3/4"-1-3/16"x3/8", some mottling, possible void with cavity infilling at 68.5-69.35', very weak (R1) zone at approximately 66.0' 69.35-70.0' - moderate yellowish brown, (10YR 5/4), very fine grained, moderate HCl reaction, weak (R2), thinly laminated, with trace very fine grain limestone rock nodules up to 1/8" voids become more common with depth from <1% up to 10-15%	R5: 6 minutes	
60			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'			
-17.9			2	57.45' - Fracture, 50 deg, rough, stepped, tight, black organics over 10-15% of surface			
60			1	57.65' - Fracture, 10 deg, rough, stepped, open, black organics over 5% surface			
60			2	59.3' - Fracture, horizontal, rough, undulating, tight			
60	NR	NR	59.8' - Fracture, 0-90 deg, rough, stepped, fine grained sandy carbonate covering 100% of surfaces	R6: 7 minutes			
65	0	61.55' - Fracture, 0-50 deg, rough, stepped, open					
-22.9	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					
65	0	62.3-64.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, weak to medium strong (R2 to R3), voids up to 1/16" over 5-10%, few cavities up to 3/16"x3/16", trace fossil molds/casts.					
65	NR	NR	64.0-64.8' - Same as 62.3-64.0' except very weak (R1), thinly laminated at 64.2' (possible organics), trace fine grained stronger rock				
70	R7-NQ 5 ft 100%	50	1	65.75' - Fracture, smooth, planar, tight, horizontal	R7: 5 minutes		
70			10	66.2-67.1' - Fracture zone, 80 deg, smooth, undulating, dominated by fracture trace inclined approximately 80 deg from 66.2-68.1', with horizontal fracture at 66.2'			
70			10	67.3-68.1' - Fracture zone, 80-90 deg, rough, undulating, tight to open			
70			3	68.55' - Fracture, horizontal, rough, undulating, open			
70			3	68.6' - Fracture, 50 deg, rough, stepped, open			
70			2	69.35' - Fracture, 40 deg, rough, undulating, tight			
70			1	69.65' - Fracture, horizontal, rough, stepped, open			
75	R8-NQ 5 ft 98%	78	1	69.8-70.0' - Fracture, 0-90 deg, rough, stepped, open	Driller's Remark: 80% loss of circulation water at 75'		
75			2	70.2' - Fracture, 0-90 deg, smooth, stepped, open			
75			2	70.65' - Fracture, 70 deg, rough, undulating, tight			
75			1	71.85' - Fracture, 10 deg, smooth, undulating, tight			
75			2	72.15' - Fracture, 40 deg, rough, stepped, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 5 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-32.9	R9-NQ 5 ft 70%	26	NR	72.2' - Fracture, 80-90 deg, rough, undulating, extends to 72.45', open	<p>70.0-72.6' - moderate yellowish brown, (10YR 5/4), very fine grained, weak (R2) with some medium strong (R3) zones, voids up to 1/16" over 15-20% of core surface, decreasing with depth, rock becoming thinly laminated and weaker with depth, punctuated with light gray/yellowish gray very fine grained, irregular-shaped nodules/clasts, voids generally lacking in lighter gray, very fine grained nodules/clasts</p> <p>72.6-74.9' - Same as 70.0-72.6' except with thick (6") beds of yellowish gray, very fine grained limestone, weak to medium strong (R2 to R3), thinly laminated with organics, in matrix of void/cavity characterized limestone No Recovery 74.9-76.5'</p> <p>Silt (ML) 76.5-77.1' - moderate yellowish brown, (10YR 5/4), wet, soft, rapid dilatancy, mild HCl reaction</p> <p>Limestone 77.1-78.4' - pale yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), very fine grained, strong HCl reaction, medium strong to weak (R3 to R2), voids up to 1/16" over 10-15% decreasing with depth, cavities typically 3/8 to 3/4"x1/16" (fossil casts/molds), becoming lighter in color and containing less voids with depth</p> <p>78.4-79.5' - fine to very fine grained, moderate HCl reaction, very weak to 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)</p> <p>79.5-80.0' - very light gray to bluish white, (N8 to 5B 9/1), very light gray mottling, very fine grained, medium strong (R3), voids (up to 1/16" or less) over 3-5%, several cavities up to 3/16"x3/16", several vertical to subhorizontal hairline fractures</p> <p>80.0-81.5' - Same as 79.5-80.0' except becoming darker (brownish) with depth, cavities common at 80.4'</p> <p>81.5-83.6' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, very weak (R1), voids up to 1/16" over 30-40% surface, cavities up to 1-3/16"-1-9/16"x2", fossiliferous (molds/casts), extremely weak (R0) rock from 82.35-82.65' No Recovery 83.6-85.0'</p>	Driller's Remark: Soft drilling from 75-77'		
80			1	1		73.95' - Fracture, 0-90 deg, smooth, stepped, tight	<p>SC-3 collected at 77.1-78.4'</p> <p>Driller's Remark: Advanced NW casing to 80', regained circulation R9: 8 minutes Driller's Remark: Very hard from 80' to approximately 81'</p> <p>Driller's Remark: Hard again at 84'</p>	
-37.9			2	2		74.1' - Fracture, <5 deg, rough, stepped, open		
80.0			3	3		74.7' - Fracture, horizontal, rough, stepped, open, clay (brown) over 90% of surface (sandy)		
85			R10-NQ 5 ft 72%	48		1		77.1' - Fracture, <5 deg, smooth, undulating, open
						2		78.45' - Fracture, 0-30 deg, rough, undulating, open, gravel filled
	NR	78.7' - Fracture, horizontal, rough, undulating, open, gravel filled						
-42.9	R11-NQ 5 ft 100%	76	3	79.65' - Fracture, 20 deg, rough, undulating, tight, black organic film over 100% of surface	<p>R10: 10 minutes</p> <p>R11: 7 minutes</p>			
85			3	80.1' - Fracture, horizontal, rough, undulating, open, dark gray staining over 30%				
90			R12-NQ 5 ft 99%	74		2	80.2' - Fracture, horizontal, rough, undulating, open, dark gray staining over 30%	
						1	80.43' - Fracture, horizontal, rough, undulating, open, dark gray staining over 100%	
						NR	81.05' - Fracture, horizontal, rough, undulating to stepped, open, brown clay lining <1/16" thick over 100% of surface	
-47.9			0	0		81.35, 81.5' - Fractures (2), smooth, planar, black organic stains over 15-20%	<p>R12: 10 minutes</p>	
90	2	2	82.35' - Fracture, horizontal, rough, stepped, open, brown clay lining (silty and sandy), up to 1/16" thick					
95	R11-NQ 5 ft 100%	76	2	82.65, 83.6' - Fractures (2), <5 deg, rough, undulating, tight, clayey				
			2	86.7, 86.8' - Fractures (2), <5 deg, rough, smooth, undulating				
			2	87.9' - Fracture, <5 deg, smooth, undulating, film of black organic stains over 100% of surface, open				
95	0	0	87.95' - Fracture, 60-70 deg, rough, stepped, open	<p>R11: 7 minutes</p>				
95.0	1	1	88.25, 88.4' - Fractures (2), <5 deg, rough, stepped, open					
95	R12-NQ 5 ft 99%	74	2		89.42, 89.7' - Fractures (2), horizontal, rough, undulating, open			
			3		91.15' - Fracture, horizontal, smooth, undulating, tight			
			2		92.4' - Fracture, 40 deg, rough, undulating, open			
95	2	2	92.4-92.95' - Fracture, vertical, rough, undulating, tight		<p>R12: 10 minutes</p>			
95.0	2	2	92.95' - Fracture, <5 deg, rough, undulating, open					
95	R12-NQ 5 ft 99%	74	2	93.5' - Fracture, 80 deg, smooth, stepped, tight				
			2					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 6 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-52.9	R13-NQ 5 ft 98%	72	NR	93.65' - Fracture, <5 deg, smooth, undulating to stepped, tight	Limestone 85.0-88.35' - Same as 81.5-83.6' except black organic laminae at 88.0' and traces of black organic laminae from 87.0-88.0' 88.35-89.45' - variegated very pale orange and very pale blue, (10YR 8/2 and 5B 8/2), strong HCl reaction, very weak (R1), possibly cavity fill with brownish limestone; fossil casts/molds, voids over 15-20%, few cavities 3/8"x3/16", three 2"x3/16" black coated cavities (possible worm burrows) 89.45-90.0' - Same as 85.0-88.35' except fossiliferous, molds/casts and original material	SC-4 collected at 98.15-99.05'	
1			94.05' - Fracture, horizontal, smooth, undulating, tight, black organic coating				
2			94.55' - Fracture, 80 deg, smooth, undulating, tight				
0			95.7' - Fracture, horizontal, smooth, planar, open				
1			96.2' - Fracture, vertical, smooth, undulating, tight				
1			96.75' - Fracture, <5 deg, rough, stepped, open				
100	R14-NQ 5 ft 100%	54	NR	98.15' - Fracture, 60 deg, rough, undulating, tight	90.0-91.15' - moderate yellow brown, (10YR 5/4), fine to very fine grained, strong HCl reaction, very weak (R1), voids up to 1/16" over 40-50%, cavities generally 3/16"x1/16", fossil casts/molds with whitish fossil layer at 90.8', thin discontinuous black organic laminae 91.15-94.95' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, very weak (R1), voids 1/16" or less over 1-5% (up to 10-15% at 92.0-92.5'), thinly laminated at 93.8' No Recovery 94.95-95.0' Limestone 95.0-95.7' - Same as 91.15-94.95' 95.7-95.9' - organic zone, thinly laminated, black peat, soft, platy 95.9-99.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids over 40-50%, cavities up to 3/4"-1-3/16"x3/8"-3/4" with thin (1/16"x3/8") black worm tubes, some cavity fill at 97.8-98.0', fossiliferous (casts/molds) No Recovery 99.9-100.0' Limestone 100.0-105.0' - Same as 95.9-99.9' 105.0-110.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids covering 10-15% in upper half of core, becoming less common with depth; cavities more common in upper half also, typically 3/8"x3/16" becoming absent with depth, some molds/casts in upper half, absent below. No Recovery 110.0-112.75'	R13: 6 minutes	
-57.9			>10	100.0-102.0' - Fracture zone, undulating, stepped, horizontal to inclined, open to tight			
			>10				
			1	102.8' - Fracture, <5 deg, rough, undulating, tight, clayey			
			0				
			1				
105	R15-NQ 5 ft 100%	40	2	104.9' - Fracture, <5 deg, rough, undulating, tight, clayey	100.0-105.0' - Same as 95.9-99.9' 105.0-110.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids covering 10-15% in upper half of core, becoming less common with depth; cavities more common in upper half also, typically 3/8"x3/16" becoming absent with depth, some molds/casts in upper half, absent below. No Recovery 110.0-112.75'	End at 13:05 on 5/3/07 depth to water 5'3" Start on 5/4/07 depth to water 5'3"	
-62.9			10	105.9' - Fracture, 70 deg, rough, planar, open			
			>10	105.9-107.9' - Fracture zone, 0-90 deg, rough, undulating to stepped, open, dominated by vertical fracture that propagates to 108.9'			
			2	105.95' - Fracture, 0-90 deg, rough, undulating, open			
			>10	108.15' - Fracture, horizontal, rough, stepped, open			
			2	108.4' - Fracture, horizontal, rough, undulating, open			
110	R16-NQ 5 ft 45%	45	NR	108.4' - Fracture, horizontal, rough, undulating, open	100.0-105.0' - Same as 95.9-99.9' 105.0-110.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids covering 10-15% in upper half of core, becoming less common with depth; cavities more common in upper half also, typically 3/8"x3/16" becoming absent with depth, some molds/casts in upper half, absent below. No Recovery 110.0-112.75'	R15: 7 minutes	
-67.9			NR	109.25' - Fracture, 0-90 deg, rough, stepped, tight			
			NR	109.35-110.0' - Fracture zone, 0-90 deg, rough, stepped, undulating, varying orientations from vertical to horizontal			
			0	112.75-115.0' - Fracture, horizontal, there are vertical fracture planes when rock has separated in thin (1/16") slices			
115			0			Driller's Remark: Upper 2.75' was lost (soft-no recovery)	
			0			R16: 7 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-72.9	R17-NQ 5 ft 100%	60	3	115.0' - Fracture, 0-40 deg, rough, stepped, tight	[Symbolic Log]	Limestone 112.75-115.0' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, very weak (R1), voids <1%, 4-5 cavities at approximately 114.2' generally 3/8"x3/8", fossils absent 115.0-119.35' - Same as 112.75-115.0' except fossiliferous zone at 118.5', casts/molds possibly original material 119.35-120.0' - Same as 115.0-119.35' except coarser grained (gravelly to sandy), voids and cavities more common than 115.0-119.35' 120.0-121.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids up to 1/16" covering approximately 15-20%, few cavities 3/8"x3/8", some mottling and some nodules of very fine grained limestone with no voids/cavities 121.3-122.7' - Same as 120.0-121.3' except voids and cavities more common, covering 60-70% of surface, fossils (casts/molds) common 122.7-124.85' - Same as 120.0-121.3' No Recovery 124.85-125.0' Limestone 125.0-128.5' - Same as 122.7-124.85' except fine to very fine grained, voids over 1-3%, cavities rare, some cavity infilling/nodules, sharp undulatory contact between different color limestone at 125.5' (possible stylolite) 128.5-129.0' - Same as 125.0-128.5' except some thin laminae, voids becoming more common, transitional with 129.0-130.0' 129.0-130.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), somewhat friable, cavities cover 70-80%, fossil molds/casts, cavity infillings/nodules 130.0-130.6' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids over 1-3% of surface, cavities 1/16"x1/16", thinly laminated, fossils (molds/casts) rare and interlaminated between very fine grained limestone	Fossiliferous zone at 118.7' R17: 9 minutes
			2	115.6' - Fracture, 0-20 deg, rough, stepped, tight			
			>10	115.7' - Fracture, horizontal, rough, planar to stepped, open			
			0	116.02' - Fracture, horizontal, smooth, planar, tight			
			>10	116.65' - Fracture, 0-70 deg, rough, stepped, tight			
			0	117.0-117.45' - Fracture zone, 0-90 deg, rough, stepped to undulating, tight to open			
120	R18-NQ 5 ft 97%	95	1	117.72' - Fracture, horizontal, smooth, planar, tight	[Symbolic Log]	119.3-120.0' - Fracture zone, various orientations, up to gravel sized limestone fragments 120.15' - Fracture, 10 deg, rough, undulating, open 125.45' - Fracture, horizontal, smooth, planar, tight 128.0-129.0' - Fracture zone, <5-90 deg, rough, undulating to stepped, open to tight 129.0' - Fracture, 60 deg, rough, undulating, open, gravel-filled 129.5-129.9' - Fracture zone, 60-90 deg, multiple fractures 130.1' - Fracture, horizontal, smooth, planar, open 133.15, 133.85' - Fractures (2), horizontal, smooth, planar, tight	SC-5 collected at 123.27-124.3' R18: 6 minutes
-77.9			0	119.3-120.0' - Fracture zone, various orientations, up to gravel sized limestone fragments			
			0	120.15' - Fracture, 10 deg, rough, undulating, open			
			0	125.45' - Fracture, horizontal, smooth, planar, tight			
			0	128.0-129.0' - Fracture zone, <5-90 deg, rough, undulating to stepped, open to tight			
125	R19-NQ 5 ft 100%	70	NR	129.0' - Fracture, 60 deg, rough, undulating, open, gravel-filled	[Symbolic Log]	129.0-130.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), somewhat friable, cavities cover 70-80%, fossil molds/casts, cavity infillings/nodules 130.0-130.6' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids over 1-3% of surface, cavities 1/16"x1/16", thinly laminated, fossils (molds/casts) rare and interlaminated between very fine grained limestone	R19: 7 minutes
-82.9			1	125.45' - Fracture, horizontal, smooth, planar, tight			
			0	128.0-129.0' - Fracture zone, <5-90 deg, rough, undulating to stepped, open to tight			
			>10	129.0' - Fracture, 60 deg, rough, undulating, open, gravel-filled			
130	R20-NQ 5 ft 96%	88	10	129.5-129.9' - Fracture zone, 60-90 deg, multiple fractures	[Symbolic Log]	130.0-130.6' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids over 1-3% of surface, cavities 1/16"x1/16", thinly laminated, fossils (molds/casts) rare and interlaminated between very fine grained limestone	R20: 7 minutes
-87.9			1	130.1' - Fracture, horizontal, smooth, planar, open			
			0	133.15, 133.85' - Fractures (2), horizontal, smooth, planar, tight			
135			3				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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) 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS						
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION									
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS									
-92.9	R21-NQ 5 ft 98%	86	NR	134.47, 134.62' - Fractures (2), horizontal, smooth, planar, open	[Symbolic Log]	130.6-132.65' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids and cavities common covering 50-60% of surface, some fossil molds/casts, some cavity infilling/nodules, some very fine grained thin laminae 132.65-134.8' - Same as 130.0-130.6' except thinly laminated, very weak (R1), yellowish brown and light olive gray mottling associated with laminae, becoming darker with depth, some cavities and voids up to approximately 5-10% coverage No Recovery 134.8-135.0' Limestone 135.0-135.25' - light olive gray, (5Y 7/2), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), thinly laminated, 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, (5Y 7/2 to 10YR 5/4), fine grained, very weak (R1), thinly laminated from 135.25-135.5' and from 137.3-137.7' (sharp contact with underlying rock), voids up to 1/16" over 15-20%, few cavities generally 3/16"x3/16", trace fossil molds/casts 137.7-139.2' - Same as 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 mottling, possible cavity infilling/nodules 139.2-139.9' - yellowish gray, (5Y 7/2), very fine grained, very weak (R1), cleaves very easily due to large cavities (worm burrows), voids over 1-3% (<1/16") cavities up to 2"-2-3/8"x3/8"-3/4" (extending completely through core), fossil molds/casts (gastropods) No Recovery 139.9-140.0' Limestone 140.0-142.5' - Same as 139.2-139.9' except becoming grayish yellow at 140.0' and grading to yellowish gray/light olive gray (5Y 7/2 to 5Y 5/2) with depth, sharp boundary between grayish-yellow and yellowish grey at 140.6', cavities becoming more frequent/dense with small voids (1/16") covering 10-15% of limestone, perhaps becoming somewhat coarser grained in depth	R21: 8 minutes						
140			2	134.72' - Fracture, horizontal, rough to smooth, stepped, open				[Symbolic Log]	Driller's Remark: 80% loss of circulation at 140'				
-97.9			0	135.25' - Fracture, 10 deg, smooth, planar, tight						[Symbolic Log]	SC-6 collected at 142.88-144.13'		
140			0	136.5' - Fracture, <5 deg, rough, stepped, open								[Symbolic Log]	R22: 10 minutes
			2	139.2' - Fracture, <5 deg, rough, undulating, open										[Symbolic Log]
	NR	139.3' - Fracture, <5 deg, rough, undulating, open, gravel between fracture planes	[Symbolic Log]										
145	R22-NQ 5 ft 87%	76		0	141.7' - Fracture, <5 deg, rough, undulating, open, dark brown organic stains	[Symbolic Log]	R23: 6 minutes						
				1	142.03' - Fracture, horizontal, rough, undulating, open with black organic coating over 100%			[Symbolic Log]					
			5	142.15' - Fracture, horizontal, rough, undulating, open, dark brown coating over 100%	[Symbolic Log]								
			0	142.4' - Fracture, horizontal, rough, undulating, open with black organic coating over 100%					[Symbolic Log]				
			1	142.5' - Fracture, <5 deg, rough to smooth, undulating, open, no coatings						[Symbolic Log]			
NR	142.85' - Fracture, 10 deg, smooth, undulating, tight	[Symbolic Log]											
145	R23-NQ 5 ft 100%		97	1		144.12' - Fracture, horizontal, rough, stepped, tight	[Symbolic Log]	R24: 6 minutes					
				0	145.1' - Fracture, horizontal, rough, undulating, open	[Symbolic Log]							
				1	145.8' - Fracture, 50-60 deg, rough, planar, open				[Symbolic Log]				
				0	145.9' - Fracture, 50-60 deg, rough, planar, open					[Symbolic Log]			
		0		146.4' - Fracture, horizontal, rough, undulating, open	[Symbolic Log]								
0	148.7' - Fracture, <5 deg, rough to smooth, undulating	[Symbolic Log]											
150	R24-NQ 5 ft 95%		70	0		150.55' - Fracture, horizontal, smooth, planar, tight	[Symbolic Log]						
				3		150.58' - Fracture, horizontal, smooth, planar, tight		[Symbolic Log]					
				0		150.83' - Fracture, horizontal, rough, stepped, open			[Symbolic Log]				
				0		[Symbolic Log]							
		1			[Symbolic Log]								
155		[Symbolic Log]											



PROJECT NUMBER: 338884.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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-112.9	R25-NQ 5 ft 100%		NR	154.67' - Fracture, <5 deg, rough, undulating, open	142.5-144.35' - yellowish gray mottled with dusky yellow, (5Y 7/2 and 5Y 6/4), fine to very fine grained, distinct boundaries between fine and very fine grained, voids more common in fine grained material covering 20-30%, 1-3% voids in very fine grained material occurring in irregular-shaped nodules, thinly laminated near top of interval, trace fossil molds/casts No Recovery 144.35-145.0' Limestone 145.0-148.7' - yellowish gray to 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 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' except very fine grained, few voids 150.0-151.0' - yellowish gray mottled with dusky yellow, (5Y 7/2 and 5Y 6/4), very fine grained, strong HCl reaction, weak (R2), voids <1/16" over 1-3%, few cavities 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% surface area 151.85-152.5' - light olive brown, yellowish gray and light gray, (5Y 5/6, 5Y 5/2 and N5), fine to very fine grained, very weak (R1), thinly laminated, voids and cavities 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 hash below 153.8' with fossils (molds/casts) common below 154.5' where rock becomes friable No Recovery 154.75-155.0'	SC-7 collected at 156.68-157.65' R25: 6 minutes	
		2	155.25' - Fracture, horizontal, rough to smooth, undulating, open				
		1	155.85' - Fracture, horizontal, rough, planar, tight				
		1	156.7' - Fracture, horizontal, rough, planar, tight				
		4	157.65' - Fracture, <5 deg, rough, undulating, open				
160				158.45-158.65' - Fracture zone, 70 deg, rough, undulating to stepped, open to tight			
-117.9				159.87' - Fracture, horizontal, rough, undulating, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-12	SHEET 10 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 on 05/03/07 START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					Limestone 155.0-155.25' - light olive gray mottled with yellowish gray, (5Y 5/2 and 5Y 7/2), strong HCl reaction, 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 HCl reaction, very weak (R1), voids (<1/16") covering 60-70% surface, trace fossil molds/casts 155.9-156.65' - yellowish gray, (5Y 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") covering 50-60%, voids <10% in gray very fine grained limestone 156.65-160.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), becoming more coarse grained and more fossiliferous (molds/casts) with depth, voids increase from 1-2% coverage to 60-70% with depth, possible void/cavity infilling from 158.0-160.0' (possible nodules/intraclasts) Bottom of Boring at 160.0 ft bgs on 5/4/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-13	SHEET 1 OF 11
SOIL BORING 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
 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 bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
40.6	0.0	1.1	SS-1	0-1-2 (3)	<p>Poorly Graded Sand With Organics (SP) 0-0.5' - moist, very loose, very fine to fine grained, 30-40% organics and roots, sand is silica</p> <p>Poorly Graded Sand (SP) 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</p>	<p>Borehole located in staked wetlands area--drill rig and equipment staged on swamp mats, surface conditions are dry</p> <p>Water table 2.0' below ground surface</p>	
	1.5						
5	5.0	1.3	SS-2	1-1-2 (3)	<p>Silty Sand (SM) 5.0-6.25' - grayish brown, (5YR 3/2), wet, very loose, very fine to fine grained, 20-25% nonplastic fines, fines appear to be organic material, slight sulfur odor, trace medium to coarse sand-sized grains, iron cemented silica sand concretions</p>		
35.6	6.5						
10	10.0	1.1	SS-3	2-3-7 (10)	<p>Clayey Sand (SC) 10.0-10.2' - dark gray, (N3), wet, loose, fine to medium grained, carbonate material, white limestone fragments incorporated (slough)</p> <p>Well Graded Sand With Silt (SW-SM) 10.2-11.1' - yellowish gray, (5Y 8/1), wet, loose, fine to coarse grained, strong HCl reaction, 10-15% nonplastic fines, material appears to be predominantly fossil fragments</p>	<p>SS-3A 10.0-10.2' SS-3B 10.2-11.1'</p> <p>Drilling's Remark: Approximately 10% loss of circulation (limestone zones)</p>	
15	11.5						
25.6	15.0	1.0	SS-4	0-1-2 (3)	<p>Well Graded Sand With Silt (SW-SM) 15.0-15.4' - Same as 10.2-11.1' except pale yellowish brown, (10YR 6/2), silty fines (slough)</p> <p>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 HCl reaction in carbonate materials</p>	<p>SS-4 15.4-16.0'</p> <p>Driller' Remark: Drilling rate slowing down at 18.5'</p>	
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-13	SHEET 2 OF 11
SOIL BORING 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
 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 bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
20.6	20.0	0.2	SS-5	50/2.5 (50/2.5")	Sandy Silt With Limestone (ML) 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		
25	25.0						
15.6	25.8	0.8	SS-6	39-50/3.5 (89/9.5")	Silty Sand (SM) 25.0-25.8' - pale yellowish orange, (10YR 8/2), moist to wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 25-30% nonplastic fines, trace fine gravel-sized, all carbonate		Stop drilling for 5/6/07 due to thunderstorm/lightning hazard Resume drilling 5/7/07, water level approximately 2.0' below ground surface Install surface casing (4") to approximately 28.5'
30	30.0						
10.6	30.3	0.3	SS-7	50/3.5 (50/3.5")	Silty Sand (SM) 30.0-30.3' - Same as 25.0-25.8'		
35	35.0						
5.6	36.5	1.2	SS-8	37-47-19 (66)	Silty Sand (SM) 35.0-36.2' - pale grayish orange grading to pale yellowish brown, (10YR 8/2 to 10YR 6/2), moist, very dense, fine to coarse grained, mild HCl reaction, 45-50% low plastic fines, 10-15% fine gravel-sized, all carbonate		Transitional to very weak limestone rock Much softer material, no loss of circulation
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-13	SHEET 3 OF 11
SOIL BORING 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
 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 bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
0.6	40.0	0.7	SS-9	26-50/2 (76/8")	Silty Gravel With Sand (GM) 40.0-40.7' - light olive gray, (5Y 5/2), moist to wet, very dense, moderate HCl reaction, predominately fine gravel to 1", 30-35% fine to coarse sand-sized, 20-25% low plastic fines, all carbonate, pyrite coating on some large fragments	|	
	40.7						
45	45.0				No Recovery 45.0-45.1' Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log	|	
-4.4	45.1	0.0	SS-10	50/1.25 (50/1.25")			
50							
-9.4							
55							
-14.4							
60							



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
 WATER LEVELS : 2.0 ft bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-4.4	45.0		1	45.3' - Fracture or mechanical break, 50 deg, rough, undulating to mostly planar	Limestone 45.0-45.9' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, medium strong (R3), 10-20% coverage of 1/6" to 1/8" small voids on surface, larger lenticular shaped cavities (up to 1/2" long 1/6"-3/16" high), exhibit preferred horizontal orientation 45.9-47.9' - Fracture zone, friable, disaggregated material, numerous "breaks" handling material (unconsolidated) 45.9-47.9' - Same as 45.0-45.9' except very weak (R1) and disaggregated, easily broken by hand into silty sand material No Recovery 47.9-50.0'	Switch to rock coring (45.0')	
	R1-NQ 5 ft 58%	0	0	45.9-47.9' - Fracture zone, friable, disaggregated material, numerous "breaks" handling material (unconsolidated)		R1: 4 minutes	
		NR					
50 -9.4	50.0		13	50.0-53.3' - unconsolidated silty, sandy, gravel material	Silty Sand With Limestone Fragments (SM) 50.0-53.3' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, 20-25% fines, 35-40% sand, 35-40% gravel-sized fragments of friable limestone with fragments 1/4"- >1" size Limestone 53.3-54.4' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, medium strong (R3), 10-20% coverage of 1/16"-1/8" voids on surface, few larger cavities/fossil molds (<1%) up to 3/4" No Recovery 54.4-55.0'	R2: 7 minutes	
	R2-NQ 5 ft 88%	2	1	53.3-54.4' - Fracture zone, rough, irregular, non planar 54.1' - Fracture, 10 deg, rough, planar, tight			
55 -14.4	55.0		47	55.4' - Fracture or mechanical break, rough, undulating, nonplanar	Limestone 55.0-56.8' - yellowish brown, (10YR 5/4), very fine grained, mild to moderate HCl reaction, weak (R2), 20-25% coverage of 1/16"-1/8" small voids on surface, very fine dark black laminations (<1/16") 1/2"-1" spacing 56.8-59.8' - Same as 55.0-56.8' except weak (R2), finer grained (silt sized particles), reduced small void density (<10%) and pronounced fine black laminations (lignite, organics) throughout interval and concentrated in zones up to 1/2" thick No Recovery 59.8-60.0' Limestone 60.0-63.8' - Same as 56.8-59.8' except weak to medium strong (R2 to R3), decreasing density of fine black layering, variable density of small voids (5-15% surface area), weak unconsolidated zone at 63.5' of silt and sand with gravel No Recovery 63.8-65.0'	Horizontal partings associated with black laminations (soft) laminae are sinuous and exhibit more pinch and swell patterns and are often slightly inclined to core diameter R3: 6 minutes	
	R3-NQ 5 ft 96%	1	2	56.4' - Fracture or mechanical break, rough, undulating, nonplanar			
		2	3	56.4, 56.8' - Fractures (2), 15 deg, rough, planar			
		3	3	57.0' - Bedding plane, 10 deg, rough, planar to stepped			
		3	3	57.7' - Mechanical break, rough, nonplanar			
		2	2	57.95, 58.3' - Bedding plane (2), 5 deg, smooth, planar, (organic layer)			
60 -19.4	60.0		40	58.6' - Bedding plane, 5 deg, smooth, 0.5" thick zone			
	R4-NQ 5 ft 76%	NR	2	58.8' - Bedding plane, smooth, planar			
		2	3	59.1' - Fracture or mechanical break, horizontal, rough, undulating			
		3	3	59.4' - Fracture, 10 deg, rough, planar to undulating			
		2	3	60.5, 60.7, 61.4, 61.7' - Fractures or mechanical break (4), horizontal, rough, undulating to planar			
		NR	2	62.1, 62.3, 62.5' - Fractures (3), <10 deg, rough, undulating to semi planar			
			2	63.4' - Fracture, rough, undulating			
			NR	63.5' - Fracture, 45 deg, rough, undulating			
65	65.0					R4: 6 minutes	



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 LEVELS : 2.0 ft bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-24.4	R5-NQ 5 ft 36%	NA	4	65.4, 65.5, 65.6, 65.7' - Mechanical break (4), horizontal, rough, undulating to planar, fine sand/silt material on fracture surface		Silty Sand (SM) 65.0-65.8' - moderate yellowish brown, (10YR 5/4), with gravel-sized limestone fragments 1/2"-2" size (disaggregated by drilling) Limestone 65.8-66.8' - moderate yellowish brown, (10YR 5/4), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 15-20% coverage of 1/16" to 1/8" small voids on surface, 1-2% coverage of larger cavities/fossil molds up to 1/4" diameter, fine silt infilling in many voids/molds No Recovery 66.8-70.0' Limestone 70.0-74.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3), fossiliferous, with 4"-6" thick poorly fossiliferous, fine grained intervals, low to medium density, up to 17-20% coverage of small (1/16"-1/8") voids and larger (up to 3/4") cavities/fossil molds, lenticular inclusions of soft black organic material up to 1-1/2"x1/4" thick at 73.2-73.8', few fine (1/16"-3/16") organic inclusions No Recovery 74.9-75.0' Limestone 75.0-80.0' - Same as 70.0-74.9' except mild HCl reaction, weak (R2), 5-15% coverage of small (1/16"-1/8") voids, loose sand-sized limestone particles on fracture surfaces	R5: 10 minutes	
70		10	NR					
-29.4		R6-NQ 5 ft 98%	0	2	71.1, 71.2' - Fracture or mechanical break (2), horizontal, rough, undulating			SC-1 collected at 71.3-72.5' R6: 8 minutes
70	67		1	72.5-73.5' - Fracture or mechanical break, vertical, rough, undulating				
-29.4	2		73.4' - Fracture, 45 deg, rough, planar					
75	0		74.1' - Fracture or mechanical break, horizontal, rough, undulating					
-34.4	NR		75.2' - Fracture or mechanical break, horizontal, rough, undulating					
75	R7-NQ 5 ft 100%	1	5	76.2' - Fracture, 5 deg, rough, planar 76.3, 76.4' - Fractures (2), 30-45 deg, rough, undulating and planar 76.8, 76.95' - Fractures (2), horizontal, rough, undulating 77.7' - Fracture, 60 deg, rough, non planar (radial) 78.0' - Fracture, 45 deg, rough, planar 78.3' - Mechanical break, horizontal, rough		R7: 7 minutes		
-34.4		50	1	79.5' - Mechanical break, 0-15 deg, rough, undulating				
80		>10	80.4-80.7' - unconsolidated zone					
-39.4		1	81.4, 82.0' - Fractures (2), horizontal, rough, undulating and planar, (either end of unconsolidated material)					
80		>10	82.0-84.0' - Fracture zone					
-39.4		23	>10					
85	R8-NQ 5 ft 80%	>10			No Recovery 84.0-85.0' R8: 6 minutes			
85		NR						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-13	SHEET 6 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 : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-44.4	R9-NQ 5 ft 98%	47	1	85.6' - Fracture, 45 deg, rough, planar	[Symbolic Log]	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
>10			86.0-88.0' - Fracture zone, 0-30 deg, limestone fragments 1/4" to 2", larger fragments exhibit semi planar surfaces				
>10			2	88.2, 88.8, 89.3, 89.5' - Fractures or mechanical break (4), horizontal, rough, undulating			
2			3	89.4' - Fracture, 45 deg, rough, planar			
3			89.4' - Fracture, 45 deg, rough, planar				
90	R10-NQ 5 ft 84%	58	NR	90.3' - Fracture, 70 deg, rough, planar	[Symbolic Log]	No Recovery 89.9-90.0' Limestone 90.0-94.2' - Same as 85.0-89.9' except highly fossiliferous zone with greater density of small voids from 90.8-91.1' (fragments <1"), finer grained with decreased density of small voids, weak to medium strong (R2 to R3) below 91.1'	Small flazer structure on fragment material, bioturbation
-49.4			>10	90.7' - Fracture, horizontal, rough, undulating to planar, black organics on surface (or fine laminae controlling break)			
>10			1	90.7-91.2' - Fracture zone			
1			2	93.0' - Fracture, horizontal, rough, undulating, open			
2			0	93.5' - Fracture, 25 deg, rough, undulating, 1/16" open			
95	R11-NQ 5 ft 96%	62	NR	93.9' - Mechanical break, horizontal	[Symbolic Log]	No Recovery 94.2-95.0' Limestone 95.0-98.0' - yellowish gray, (5Y 4/2), variable density of small voids (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, dark brown/black (organic) inclusions (1/16"-1/8") and as thin (1/16") fine stringers	R9: 7 minutes
-54.4			2	95.2' - Fracture, 5 deg, planar			
1			1	95.7' - Fracture, 60 deg, rough, planar			
2			2	96.8' - Mechanical break, rough, undulating			
>10			2	97.3, 97.35' - Fractures (2), 60 deg, rough, planar			
100	R12-NQ 5 ft 90%	33	>10	97.9' - Fracture, horizontal, rough, nonplanar, brownish black coating on surface (soft)	[Symbolic Log]	98.0-98.7' - fine grained, strong to very strong (R4 to R5), dense 98.7-99.8' - Same as 95.0-98.0' except mild to moderate HCl reaction, weak to medium strong (R2 to R3) No Recovery 99.8-100.0' Limestone 100.0-104.5' - Same as 95.0-98.0' except medium strong (R3), 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 fossil molds/casts infilled with soft clayey carbonate material	SC-2 collected at 91.75-92.5'
-59.4			>10	98.0-98.7' - Fracture zone, rock fragments, conchoidal fracture faces, undulating, near vertical break, few 45-60 deg fractures on fragments			
NR			1	98.9, 99.2, 99.8' - Fractures (3), horizontal, rough, undulating			
>10			>10	100.0-101.0' - Fracture zone, vertical, rough, planar to undulating, 3/4"-1" angular rock fragments with large (4"-5") long partial core pieces			
1			>10	101.3' - Fracture, 70 deg, rough, planar			
105	R12-NQ 5 ft 90%	33	>10	102.0-102.7' - Fracture zone, limestone fragments	[Symbolic Log]	102.8' - Fracture, 45 deg, rough, undulating 103.3' - Fracture or mechanical break, horizontal, rough, undulating 103.3-104.5' - Fracture zone, horizontal, rough, planar to undulating, partings with 1-2" spacing No Recovery 104.5-105.0'	R10: 12 minutes
>10			>10	102.8' - Fracture, 45 deg, rough, undulating			
>10			>10	103.3' - Fracture or mechanical break, horizontal, rough, undulating			
105	NR	NR	NR	103.3-104.5' - Fracture zone, horizontal, rough, planar to undulating, partings with 1-2" spacing			R11: 11 minutes
							R12: 6 minutes



PROJECT NUMBER: 338884.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
 WATER LEVELS : 2.0 ft bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-64.4	R13-NQ 5 ft 82%	40	>10	105.2-105.8' - Fracture zone, limestone fragments (1/2"-1-1/2")		Limestone 105.0-107.5' - grayish orange to light olive gray, (10YR 7/4 to 5Y 5/2), mild to moderate HCl reaction, weak (R2), <5% coverage of small (1/16"-1/8") voids on surface, moderately friable 107.5-109.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") and larger cavities/fossils/molds (up to 1/2" max dimension) 5-10% coverage on surface, few fossil casts, partial fine recrystallization No Recovery 109.1-110.0' Limestone 110.0-113.9' - Same as 107.5-109.1' except medium strong to strong (R3 to R4), fewer cavities/fossil molds >1/4" No Recovery 113.9-115.0'	R13: 10 minutes
>10			106.7' - Fracture, 45 deg, rough, undulating				
0			106.8-107.1' - Fracture zone, weak friable material, 1/2"-2" fragments, dark brown/black staining (possibly pyrite) on few fragment/fracture surfaces				
>10			108.7-109.1' - Fracture zone, rough, undulating				
NR							
110 -69.4	R14-NQ 5 ft 78%	57	2	110.1' - Fracture or mechanical break, horizontal, rough, planar		No Recovery 109.1-110.0' Limestone 110.0-113.9' - Same as 107.5-109.1' except medium strong to strong (R3 to R4), fewer cavities/fossil molds >1/4" No Recovery 113.9-115.0'	R14: 9 minutes
2			111.3' - Fracture, rough, undulating, fine limestone fragments				
2			111.6' - Fracture, rough, undulating to partially stepped				
1			112.0' - Fracture, 70 deg, rough, undulating, with thin spalls, black staining/coating on surface (pyrite) somewhat radiated surface				
NR			112.6, 113.7' - Fractures (2), 45 deg, rough, planar				
115 -74.4	R15-NQ 5 ft 90%	37	>10	115.0-116.0' - Fracture zone, 1"-3" rock fragments, larger fragments exhibit 30 deg orientation, planar surfaces		Limestone 115.0-119.5' - intermingled zones of pale yellowish orange and light olive gray, (10YR 8/6 and 5Y 5/2), moderate HCl reaction, medium strong (R3), 5-10% coverage of small (1/6"-1/8") voids on surface, partial recrystallization No Recovery 119.5-120.0'	R15: 10 minutes
3			116.1, 116.2' - Fractures or mechanical break (2), horizontal, rough, undulating				
1			116.5' - Fracture, 75 deg, rough, undulating to planar				
1			117.0' - Mechanical break, horizontal, rough, undulating				
1			118.0' - Fracture, 45 deg, rough, planar				
1			118.5' - Fracture or mechanical break, 15 deg, rough, planar				
120 -79.4	R16-NQ 5 ft 80%	55	NR	119.1' - Fracture or mechanical break, rough, undulating		Limestone 120.0-124.0' - Same as 115.0-119.5' except mild HCl reaction, strong (R4), larger cavities (1/4"-1/2") present in discrete zones of variable spacing, most prominent in fragmented zones (123.0-123.4'), blackish brown staining on some fracture/fragment surfaces, minor recrystallization, color becoming darker with depth light olive gray (5Y 5/2) to medium olive brown (5Y 4/4) No Recovery 124.0-125.0'	R16: 11 minutes
1			120.6' - Fracture, 15 deg, rough, planar				
4			121.0' - Mechanical break, rough, undulating				
>10			121.1-121.3' - Fracture zone				
1			121.3' - Mechanical break, rough, undulating				
125			NR	122.1' - Mechanical break, horizontal, rough, undulating			
				122.9-123.3' - Fracture zone, limestone fragments (1/2"-1-1/2"), dark brown staining on surfaces			
				123.3, 124.0' - Fractures or mechanical break (2), horizontal, rough, undulating and planar			



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
 WATER LEVELS : 2.0 ft bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-84.4	R17-NQ 5 ft 78%	43	4	125.35, 123.55' - Mechanical break (2), horizontal, rough, undulating	[Symbolic Log]	Limestone 125.0-128.9' - yellowish orange to pale yellowish brown, (10YR 8/6 to 10YR 6/2), mild HCl reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1/16"-1/8" small voids on surface, larger oval shaped (fossil molds) cavities (1/4"-1/2") occur variably throughout depth but <5% surface area, very fine grained dense interbeds at 125.75-125.9' and 126.0-126.3' yellowish gray (5Y 7/2), laminated, with <5% small (1/16"-1/8") voids No Recovery 128.9-130.0'	Fresh fracture faces indicate possible partial recrystallization	
1			125.7' - Fracture, vertical, rough, undulating, healed fracture, tight					
>10			125.75, 125.9' - Bedding plane (2), horizontal, planar					
1			126.0' - Fracture, horizontal, rough, undulating					
NR			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					
130	R18-NQ 5 ft 42%	0	>10	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	[Symbolic Log]	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, 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'	R17: 9 minutes Driller's Remark: 100% loss of circulation at 132.0' below ground surface, soft drilling, possible void R18: 4 minutes	
>10								
NR								
135	R19-NQ 5 ft 74%	27	>10	135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings	[Symbolic Log]	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, (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'	Fine black staining on few fractures (pyrite) SC-4 collected at 135.7-136.6' R19: 10 minutes	
-94.4			1	135.7' - Fracture, horizontal, rough, planar				
>10			136.7' - Mechanical break, rough, undulating					
1			136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments					
NR			138.2' - Mechanical break, 60 deg, rough, planar					
140	R20-NQ 5 ft 60%	13	1	140.9' - Fracture, 40 deg, smooth, planar	[Symbolic Log]	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 "punk" texture on fresh surfaces	
-99.4			2	141.1' - Fracture or mechanical break, vertical, rough, undulating				
3			141.4-142.2' - Fracture zone, limestone fragments <1"					
NR			142.5' - Fracture or bedding plane, horizontal, smooth					
			142.8' - Fracture, vertical, rough, undulating, healed, tight					
145			NR	143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface		R20: 13 minutes		



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
 WATER LEVELS : 2.0 ft bgs on 5/6/07 START : 5/6/2007 END : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-104.4	R21-NQ 5 ft 80%	17	>10	145.0-145.4' - Fracture zone, rock fragments 1/2" thick	[Symbolic Log]	140.5-143.0' - very pale yellowish gray, (5Y 7/2), moderate HCl reaction, medium strong to strong (R3 to R4), small zones (<1") of dark gray, fossil molds up to 3/4", numerous small voids (5%-20% surface area) becoming denser, hard below 142.0', black coating on some fracture faces (pyrite) No Recovery 143.0-145.0' Limestone	Disaggregate carbonate sand 146.8-147.2'	
			4	145.75' - Fracture, 10 deg, rough, planar				
			>10	146.3' - Fracture or mechanical break, rough, undulating				
			3	146.4' - Bedding plane, horizontal, rough, discontinuity with fine grained limestone				
			NR	146.6' - Fracture, >80 deg, rough, undulating, healed				
150	R22-NQ 5 ft 100%	15	NR	146.8' - Bedding plane, discontinuity with yellowish brown, weak, loose, carbonate sand zone	[Symbolic Log]	145.0-146.8' - yellowish gray, (5Y 7/2), mild HCl reaction, medium strong to strong (R3 to R4), small voids (1/16"-1/8") and larger cavities/fossil molds up to 1/2" variable across interval from trace to >10%, thin (1") fine grained beds show indications of very fine laminations	R21: 15 minutes	
-109.4			2	147.5-147.8' - Fracture zone, vertical, limestone fragments 1-1/2"-3"				
			>10	147.8, 148.0' - Bedding plane (2), horizontal, smooth				
			6	148.6' - Mechanical break, horizontal, rough, undulating				
			>10	148.9, 149.0' - Fractures (2), 45 deg, rough, planar				
			>10	150.8' - Fracture or mechanical break, horizontal, rough, planar				
			>10	150.9' - Fracture, >80 deg, rough, undulating				
155	R23-NQ 5 ft 68%	25	>10	151.0-152.0' - Fracture zone, mostly rough, undulating horizontal fractures, few 45 deg rough, planar fractures, limestone fragments 3/4"-2-1/2" in length	[Symbolic Log]	146.8-147.2' - medium olive brown, fragmented (1/4"-3/4" size), friable, coarse carbonate sand 147.2-147.7' - medium olive brown, weak (R2) 147.7-149.0' - Same as 145.0-146.8' except light olive gray, (5Y 5/2) No Recovery 149.0-150.0' Limestone	Weak along laminae, dark laminations may be biofeature (algae) R22: 15 minutes	
-114.4			2	152.0, 152.1, 152.3, 152.5, 152.7, 152.9' - Fractures (6), horizontal, rough, undulating				
			3	153.0-154.0' - Fracture zone, horizontal, rough, undulating, partings controlled by bedding lamination				
			>10	154.0-155.0' - Fracture zone, 20-45 deg, rough, undulating				
			>10	155.3' - Fracture, 15 deg, rough, planar				
			NR	155.4, 155.6' - Fractures (2), 10-15 deg, rough, undulating				
			NR	156.5' - Fracture, horizontal, rough, planar				
160	R24-NQ 5 ft 50%	0	>10	156.6' - Fracture, rough, undulating	[Symbolic Log]	150.0-152.8' - Same as 145.0-146.8' except light olive gray, (5Y 5/2), mild HCl reaction, medium strong (R3) 152.8-153.9' - mottled grayish yellow and light olive gray, (5Y 8/4 and 5Y 5/2), medium strong (R3), thin (1"-2") dark yellowish brown (10YR 4/2) fine wavy laminations, dark laminations slightly inclined (5-10 deg) 153.9-155.0' - Same as 150.0-152.8' except strong (R4), denser, fewer voids	R23: 11 minutes	
-119.4			1	156.8' - Fracture, horizontal, rough, planar				
			0	157.2' - Bedding plane, 4-5 deg, break on fine grained layer				
			NR	157.2-158.4' - Fracture zone, horizontal, planar, rock fragments 3/4"-2" in length				
165	R24-NQ 5 ft 50%	0	>10	161.3' - Fracture, 75 deg, undulating, slightly radial, 6" long	[Symbolic Log]	155.0-156.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), strong (R4), mottled appearance, <5-10% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds up to 1/2" increasing with depth, dense 156.3-158.4' - Same as 155.0-156.4' except increasing percentage of small voids uniformly distributed, color darkening to medium olive brown (5Y 4/4), very fine laminated dense interbed at 157.6-158.1' No Recovery 158.4-160.0' Limestone	The rig CME 55 (S/N 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'	
			NR	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%) No Recovery 162.5-165.0'				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-124.4	R25-NQ 5 ft 76%	>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 small (<1/8") voids, 10% coverage of 1"-1-3/8" fossil molds/cavities, trace carbonate infill of cavities, light olive gray (5Y 6/1) coloration of fractured surfaces 167.4-168.8' - medium dark gray to yellowish gray, (N5 to 5Y 5/2), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), trace to 10% coverage of 1/16" voids increasing with depth, visible casts/cavities No Recovery 168.8-170.0' Limestone 170.0-170.2' - Same as 165.0-167.4' 170.2-171.1' - Same as 165.0-167.4' 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' except size of large casts/cavities up to 1-3/16"x3/4" over 30% of rock at 173.5-174.5' No Recovery 174.5-175.0' Limestone 175.0-176.0' - pale yellowish brown to dark gray, (10YR 8/2 to N3), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids up to 1/16" in size, 10-15% coverage of 1-3/16"x3/8" casts/cavities, with infill/recrystallization of yellowish brown, fine to medium grained carbonate 176.0-177.9' - pale yellowish brown, (10YR 8/2), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), 10-15% coverage of <3/16" voids No Recovery 177.9-180.0' Limestone 180.0-184.5' - Same as 176.0-177.9' except 40-50% casts/cavities at 180.75-181.1' and 183.7-183.9' (up to 1-3/16"x9/16"), and highly 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' No Recovery 184.5-185.0'	5/9/07, 14:00 hrs - Rig changed to one with a cathed to allow pull-back hammering 16:00 hrs - Only 10' of rods removed, decide to overdrill with HQ tools 16:20 hrs - Start installing HQ 19:00 hrs - HQ tools will not go through 4" bit, HQ tools pulled and resumed back hammering Driller's Remark: Core barrel retrieved, hole currently cased from 0-60' with HW casing Driller's Remark: extending HW casing to 90' Driller's Remark: HW casing installed to 90'; NQ rod and tri-cone bit equipped to reach sampling depth of 165' P. De Sa'rego begins logging R25: 28 minutes Driller's Remark: Chatter approximately 145' Driller's Remark: Chatter approximately 150'-155' Driller's Remark: Chatter at approximately 160' R26: 24 minutes Driller's Remark: Chatter R27: 58 minutes Driller's Remark: Chatter Driller's Remark: Chatter R28: 46 minutes	
		>10		166.35' - Fracture, <10 deg, rough, undulating, 1/8"-3/16" relief				
		8		166.35-165.55' - Fracture zone, vertical, rough, planar, <1/16" gray carbonate infill				
		>10		166.6' - Fracture, horizontal, smooth, planar 166.8, 166.9, 167.0, 167.2' - Fractures (4), <10 deg, smooth, undulating				
		NR		167.4, 167.8, 167.9' - Bedding plane (3), horizontal, smooth, planar 167.7' - Mechanical break 167.9-168.8' - Fracture zone				
170 -129.4	R26-NQ 5 ft 90%	8		170.0-170.2' - Fracture zone 170.2-170.8' - Fracture, 60 deg, smooth, undulating				
		>10		170.8' - Mechanical break 170.95-171.25' - Fracture zone				
		>10		171.4, 171.6, 172.05, 172.2, 173.1, 173.45, 173.8, 174.2' - Fractures (8), <10 deg, rough, undulating				
		6		172.4-172.6' - Fracture zone 172.8-173.0' - Fracture zone				
		1						
175 -134.4	R27-NQ 5 ft 58%	NR		175.0-176.1' - Fracture zone				
		>10		176.35, 176.45, 176.7, 176.75, 176.8' - Fractures (5), horizontal, smooth, planar to undulating				
		2		176.45-176.7' - Fracture zone 176.8-177.0' - Fracture zone				
		NR		177.4' - Fracture, horizontal, rough, planar to undulating 177.75' - Fracture, 60 deg, rough, undulating 177.76' - Mechanical break				
180 -139.4	R28-NQ 5 ft 90%	>10		180.75-180.9' - Fracture zone, possibly due to cavities in rock				
		6		181.2' - Fracture, horizontal, smooth to rough, undulating, 1/4"-3/8" relief				
		>10		181.5, 181.55' - Fractures (2), 25 deg, smooth, planar, along laminae of darker material				
		>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" relief				
		1						
185		NR		182.5-182.9' - Fracture zone				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-13	SHEET 11 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 : 5/23/2007 LOGGER : C. Sump, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-144.4	R29-NQ 5 ft 86%	22	>10	183.2-183.9' - Fracture zone 184.1' - Bedding plane, horizontal, rough, planar 185.2-185.9' - Fracture zone 186.0' - Mechanical break 186.3' - Fracture, horizontal, rough, undulating, 3/8" relief, <1/16" carbonate infill 186.4' - Mechanical break 186.7-186.95' - Fracture zone 187.5' - Fracture, <5 deg, smooth, undulating 187.8' - Fracture, <5 deg, rough, undulating, <1/8" relief 187.95' - Fracture, horizontal, rough, undulating, <3/16" relief		Limestone 185.0-187.6' - pale yellowish brown, fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), 10% coverage of <3/16" voids, trace casts/cavities up to 9/16"x3/8" with partial carbonate recrystallization on surfaces 187.6-189.3' - Same as 185.0-187.6' except 15-35% voids up to 1/8" increasing with depth, with trace casts/cavities up to 9/16"x1" No Recovery 189.3-190.0'	R29: 37 minutes
190			>10	188.2-188.4' - Fracture zone			
-149.4			>10	188.55, 188.9, 189.0, 189.1, 189.15' - Fractures (5), horizontal, smooth, planar to undulating, 1/16" relief 190.0-190.55' - Fracture zone 190.9-191.1' - Fracture zone 191.3' - Fracture, 15 deg, smooth to rough, undulating			
195			>10	191.5-191.6' - Fracture zone 191.8-192.1' - Fracture zone 192.3' - Fracture, 30 deg, rough, undulating 192.4-192.6' - Fracture zone, 60 deg, smooth to rough, undulating, gray staining over <10% of fracture surface			
-154.4			3	192.95' - Fracture, 30 deg, smooth to rough, undulating, gray staining over 75% surface 193.15-193.3' - Fracture zone 195.0-195.4' - Fracture zone			
195			NR	195.7-196.0' - Fracture zone			
195	R30-NQ 5 ft 72%	8	>10	196.3-196.8' - Fracture zone or mechanical break, 40 deg, rough, undulating, pale yellowish brown recrystallization (carbonate, fine to medium grained) on 100% of surface, 3/16"-3/8" relief		Limestone 190.0-193.6' - Same as 175.0-176.0' except 10-15% voids up to 3/16" and black laminations from 190.5-192.3', increased (50% by volume) carbonate infill of cavities and casts No Recovery 193.6-195.0'	R30: 51 minutes
195			1	196.1-196.8' - Same as 175.0-176.0' except 5-10% casts/cavities up to 9/16"x1-3/16"			
-154.4			NR	No Recovery 196.8-200.0'			
200	R31-NQ 5 ft 36%	16	>10			Limestone 195.0-196.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, strong (R4), 40-50% lenses of medium dark gray (4N), 5% coverage of small (1/16") voids on surface, trace casts/cavities up to 3/8"x3/8" 196.1-196.8' - Same as 175.0-176.0' except 5-10% casts/cavities up to 9/16"x1-3/16" No Recovery 196.8-200.0'	Driller's Remark: 100% fluid loss at 196' R31: 15 minutes
-159.4			NR				
200						Bottom of Boring at 200.0 ft bgs on 5/23/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.4						16:35 - Began drilling
	3.5					
		1.5	SS-1	2-2-1 (3)		6" slough removed for photo
5 37.4	5.0					
	8.5					
		1.2	SS-2	3-4-5 (9)		
10 32.4	10.0					
	13.5					
		1.3	SS-3	1-3-5 (8)		
15 27.4	15.0					
	18.5					
		1.3	SS-4	2-4-2 (6)		17:30 - Stopped drilling for the day at 20'
20	20.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 1.7 ft bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
22.4			6"-6"-6" (N)	Poorly Graded Sand (SP) 18.6-19.4' - very light gray, (N8), wet, loose, fine grained, <5% fines, no HCl reaction, silica sand 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		Began drilling on 3/15/07 at 08:25
23.5	1.2	SS-5	5-7-8 (15)	Clayey Sand (SC) 23.5-24.6' - medium light gray, (N6), wet, medium dense, fine grained, no HCl reaction, 22% medium plastic fines, trace very fine sand-sized black minerals, CH lenses at 23.55-23.6', 24.2-24.25' and 24.55-24.6' Silt (ML) 24.6-24.7' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% fine sand, all carbonate material		Driller's Remark: Shallow rock ledge or bedrock
25 17.4	25.0					
28.5	1.1	SS-6	5-8-29 (37)	Silt With Sand (ML) 28.5-29.6' - grayish orange, (10YR 7/4), wet, hard, low plasticity, slow to rapid dilatancy, 15% fine sand, 5-10% medium to coarse sand, lenses of coarse sand at 28.6' and 29.4-29.6', 1" limestone fragment near bottom of sample; Sandy Fat Clay (CH) lenses at 28.65' and 29.0'		
30 12.4	30.0					
33.5	0.1	SS-7	50/1.5 (50/1.5")	Sandy Silt (ML) 33.5-33.6' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 40-45% fine to coarse grained sand, all 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
35 7.4	33.5					
38.5 38.8	0.0	SS-8	50/3 (50/3")	Limestone Fragments 38.50-38.55' - light olive gray, (5Y 6/1), mild HCl reaction, fragments up to 1/2", voids up to 1/16" over 15-20% of surface		12:25 Set 6" diameter casing to 8.5' and 20' HW casing 14:30 - End drilling on 3/15/07
40						



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
 WATER LEVELS : 1.7 ft bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
2.4			6"-6"-6" (N)			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 Remark: Begin drilling from 38.5' with AWJ rod and 2-7/8" tricone bit (new bit) at 15:20
42.5 42.8	0.2	SS-9	50/3 (50/3")	Silt With Limestone (ML) 42.5-42.65' - light olive gray, (5Y 5/2), wet, low plasticity, mild to moderate HCl reaction, medium to coarse sand-sized and fine gravel-sized limestone, voids up to 1/16" in diameter covering 15-25% of surface, no visible casts or molds		SS-9 collected from 42.5' to 44.0'
45 -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 47.9	0.3	SS-10	50/4.5 (50/4.5")	Sandy Silt (ML) 47.5-47.75' - pale yellowish brown, (10YR 6/2), wet, hard, nonplastic to low plasticity, rapid dilatancy, mild to moderate HCl reaction, 30-35% fine to coarse sand, all carbonate material		SS-10 collected from 47.5-49.0'. 16:45 Stopped drilling at 53.5' for the day on 3/20/07
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'
53.5 54.8	1.3	SS-11	33-50-50/4 (100/10")	Sandy Silt (ML) 53.5-54.8' - moderate yellowish brown, (10YR 5/4), wet, hard, low plasticity, slow to rapid dilatancy, mild HCl reaction, 30% fine to medium grained sand, 3/16" thick grayish black (N2) organic lens at 53.75', other irregular organic lenses and stringers throughout sample		
55 -12.6						
58.5 59.4	0.9	SS-12	26-50/5 (76/11")			
60						



PROJECT NUMBER: 338884.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 bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-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						
63.9	0.4	SS-13	50/5 (50/5")	Silt With Sand (ML) 63.5-63.9' - Same as 58.5-59.4' except dark yellowish orange, (10YR 6/6), up to 20% fine to medium sand		
65						Driller's Remark: 66.5-67' hard layer, light chatter
-22.6						
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), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 25% low plasticity fines, around 50% of sample is limestone lenses up to 1" in size, voids up to 1/16" in size over 5-10% of surface, all carbonate material		Driller's Remark: Slow drilling and moderate chattering, hard rock
70						
-27.6						
73.5						
	0.0	SS-15	50/1 (50/1")	Limestone Fragments 73.5-73.55' - Fragments up to 1/2" in size, with Silty Sand (SM) as in 68.5-69.15'		Driller's Remark: Advance HW casing from 38.0' to 73.5'
75						
-32.6						
78.5						
78.9	0.0	SS-16	50/5 (50/5")	Limestone Fragments 78.50-78.55' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, up to 1/2" in size, voids up to 1/16" over 50-70% of surface, no visible fossils or cavities		
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14	SHEET 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 bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
-37.6			6"-6"-6" (N)			Driller's Remark: 81.5-82.5' soft rock Driller's Remark: 82.5-83.5' hard, heavy chattering Driller's Remark: Stopped drilling at 83.5' at 18:10 Driller's Remark: Start SPT with AWJ rod on 3/22/07 at 08:10
83.5						
84.4	0.0	SS-17	37-50/5 (87/11")	Silty Sand With Limestone (SM) 83.5-83.55' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 29% low plasticity fines, 50% of sample is gravel-sized limestone fragments up to 1/2" in size, voids up to 1/16" over 40-60% of surface, all carbonate material		
85 -42.6						Driller's Remark: 87.5-88.0' heavy chatter, hard rock
88.5						
88.8	0.0	SS-18	50/3 (50/3")	Limestone Fragments 88.50-88.55' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, very poor recovery, fragments up to 1/2", voids up to 1/16" over 15-25% of surface, moderately fossiliferous, no visible cavities		Driller's Remark: 90.0-93.5' moderate chatter, slow drilling, hard rock
90 -47.6						
93.5						
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 dense, low plasticity, moderate HCl reaction, 30% fine to medium grained sand, pale yellowish brown (10YR 6/2) limestone lenses up to 1/4" thick		
95 -52.6						
98.5						
98.9	0.3	SS-20	50/5 (50/5")	Limestone 98.5-98.8' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, limestone fragments up to 1/2"x3/4"		
100				Begin Rock Coring at 98.4 ft bgs See the next sheet for the rock core log		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100 -57.6	R1-NQ 5 ft 83%	10	>10 5 >10 >10 >10 NR	<p>98.9-99.2' - Fracture zone (2), rough, undulating, 1-3/4"x1-3/4" fragments, many fracture orientations</p> <p>99.4' - Fracture or mechanical break, 20 deg, rough, undulating, potential mechanical break, tight, fossils on surface</p> <p>99.6, 99.75, 99.95' - Fractures or mechanical break (3), 30, 90, 90 deg, smooth, undulating</p> <p>100.15-101.1, 101.6-102.6' - Fracture zone (4), 45 deg, smooth, undulating, 1"-3" fragments, broken along weaker rock</p>	<p>Limestone 98.4-102.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to medium strong (R1 to R3), 40% of rock mottled with irregularly shaped infilled cavities (bioturbation zones), voids (1/16") over <5% of surface (25-50% in bioturbated zones), up to 1/4"x3/4" trace fossils, highly fractured, many discontinuities; very weak rock from 98.4-99.2', 100.15-101.1' and 101.6-102.6'</p> <p>No Recovery 102.6-103.4'</p>	<p>Water level 2.9' below ground surface on 3/23/07 at 08:20, borehole depth at 98.5'</p> <p>Driller's Remark: Assembled NQ coring assembly (NW casing with attached drill bit is 8.15' long)</p> <p>Driller's Remark: At 98.5' switch to NQ rock coring assembly at 10:25, length from kelly down position to ground is 3.3'</p> <p>Start coring at 11:50 R1: 19 minutes</p>	
105 -62.6	R2-NQ 5 ft 82%	30	1 >10 >10 >10 0 NR	<p>103.8' - Fracture, 15 deg, smooth, undulating, potential mechanical break, tight</p> <p>104.5' - Fracture or mechanical break, 20 deg, rough, stepped to undulating, tight</p> <p>104.7-104.9' - Fracture zone (2), 1/2"-1-1/2" fragments, multiple orientations</p> <p>104.9' - Fracture, 70 deg, smooth, undulating, open</p> <p>105.0' - Fracture or mechanical break, 80 deg, smooth, undulating, open, intersects 104.9' fracture</p> <p>105.1' - Fracture, <10 deg, rough, undulating, open</p> <p>105.2' - Mechanical break, 45 deg, rough, undulating, open 1/2" to tight</p> <p>105.5' - Fracture, 50 deg, smooth, undulating</p> <p>106.1-106.9' - Fracture zone (2), fragments up to 1"x2", multiple orientations, tight to open 1/4"</p> <p>107.1' - Fracture, 55 deg, smooth, undulating, tight</p> <p>107.3' - Fracture, 45 deg, rough, undulating to stepped, tight</p> <p>108.5' - Fracture, 70 deg, rough, undulating, loose</p> <p>108.8' - Fracture, 20 deg, rough, undulating to stepped, loose</p> <p>108.9-109.1' - Fractures (2), 5 deg, rough, undulating, tight</p> <p>109.0' - Fracture, 80 deg, smooth, undulating, black staining (crystal faces) on surface, tight to open 1/4"</p> <p>109.7' - Fracture zone, black staining, up to 1/2"x1-1/4" fragments</p> <p>109.9-110.2' - Fractures (2), 80 deg, rough, undulating, loose</p> <p>110.0' - Fracture, 70 deg, same as 109.9'</p> <p>110.1' - Fracture or mechanical break, 5 deg, rough, stepped, tight</p> <p>110.7' - Fracture, 10 deg, rough, undulating, open</p> <p>110.9' - Fracture, 10 deg, rough, undulating, black metallic crystals, tight to open 1/8"</p>	<p>Limestone 103.4-107.5' - grayish orange, (10YR 7/4), medium grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 0-20% of surface in mottled pattern, fossils up to 1/4"x1/2" over 5-10% of surface</p> <p>No Recovery 107.5-108.4'</p> <p>Limestone 108.4-112.8' - moderate yellowish brown, (10YR 5/4), medium grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 35-45% of surface, fossil casts up to 1/4"x1/2" over <5% of surface</p> <p>No Recovery 112.8-113.4'</p> <p>Limestone 113.4-118.2' - Same as 108.9-112.8'</p>	<p>R2: 18 minutes</p> <p>R3: 15 minutes</p> <p>Driller's Remark: 115-115.5', void, lost circulation, using more pressure to drill SC-1 collected at 114.8-115.9'</p> <p>R4: 10 minutes Stop drilling for day at 17:10 on 3/23/07 at 118.4'</p>	
110 -67.6	R3-NQ 5 ft 88%	38	6 5 2 5 0 NR				
115 -72.6	R4-NQ 5 ft 96%	82	1 4 1 1 1				
118.4							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 1.7 ft bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
120 -77.6	R5-NQ 5 ft 72%	20	NR >10 >10 >10 4 NR 9 4 1 NR 7 7 NR >10 >10 0 NR	111.6-111.7' - Fractures or mechanical break (2), 5 deg and 70 deg, rough, undulating, tight 111.8-111.9' - Fractures (2), 10 deg and 70 deg, smooth, undulating, tight 112.8-113.4' - Fracture zone (2), 1"x1-1/2" fragments 114.2-114.4' - Fracture zone (2), 1"x1-1/2" fragments 114.5-114.6' - Fractures (2), 30 deg, smooth, undulating, intersecting, tight to open 1/4" 114.65-114.8' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to open 1/4" 115.9' - Fracture, same as 114.65', tight 117.3' - Fracture, 45 deg, smooth, undulating to stepped, tight 117.8' - Fracture or mechanical break, 10 deg, smooth, undulating to stepped, tight to open 1/4" 118.6,-118.7' - Bedding plane or mechanical break (2), horizontal, smooth to undulating, stepped, tight to open 1/8" 118.7-119.6' - Fracture zone (2), up to 1-3/4"x2" sized fragments, many fractures at 0 deg, a few at 70-80 deg 119.7' - Fracture, 80 deg, smooth, undulating, tight 120.3' - Fracture, 40 deg and 45 deg, smooth, undulating, tight 120.8' - Fracture, 80 deg, rough, undulating, tight 120.9' - Mechanical break 121.0-121.5' - Fracture zone (2), breaks at 80-90 deg, many discontinuities up to 1-3/4"x1-3/4" fragments 121.5' - Bedding plane, horizontal, smooth, undulating, open 121.8-121.9' - same as 121.5' except tight 121.85' - Fracture, 80 deg, rough, undulating, open 123.4-123.7' - Fracture zone (2), three rock fragments 123.9, 124.2, 124.45' - Fracture or mechanical break (3), horizontal and 10 deg, rough, undulating, open 124.7-124.75' - Bedding plane or mechanical break (2), horizontal, smooth, planar to undulating, tight to 1/4" open 125.0' - Bedding plane or mechanical break, horizontal, smooth, planar to undulating, open 125.4' - Fracture, 60 deg, planar to stepped, open 1/4"-1/2" 128.5' - Fracture, 40 deg, rough, undulating, open 128.8' - Fracture, 70 deg, rough, undulating, tight to open 1/5" 128.85' - Fracture, 30 deg, rough, undulating, tight to open 1/8"	No Recovery 118.2-118.4' Limestone 118.4-122.0' - Same as 108.9-112.8' except voids up to 1/16" over 15-25% of surface No Recovery 122.0-123.4' Limestone 123.4-125.9' - Same as 108.9-112.8' except voids up to 1/16" over 15-40% of surface increasing with depth, trace fossil casts up to 1/16"x1/4" No Recovery 125.9-128.4' Limestone 128.4-131.2' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), voids up to 3/16" over 10-20% of surface, trace fossil casts up to 1/4" diameter No Recovery 131.2-133.4' Limestone 133.4-134.25' - light olive gray, (5Y 5/2), very fine to fine grained, mild to moderate HCl reaction, medium strong (R3), voids (1/16") over <10% of surface, trace fossil casts up to 1/2"x1/4" 134.25-134.65' - dusky yellow, (5Y 6/4), medium to coarse grained, moderate HCl reaction, medium strong (R3), voids (3/16") over 15-30% of surface, 5-10% fossil casts up to 3/6"x1/2" 134.65-134.8' - Same as 133.4-134.25'	Start drilling on 3/24/07 at 08:05 Still no circulation Driller's Remark: 121.4-121.6' small void R5: 9 minutes Driller's Remark: Void at 124.7-125.8' R6: 12 minutes Water level at 1.9' below ground surface on 3/26/07 at 08:00 Water level 1.9' below ground surface on 3/27/07 at 08:08 Driller's Remark: No circulation during run Driller's Remark: Light chatter from 128.4-132.4' Driller's Remark: no chatter, faster drilling from 132.4-132.9' R7: 12 minutes Driller's Remark: Very soft from 133.4-135.4', harder from 135.4-137.4', soft from 137.4-138.4' R8: 8 minutes
125 -82.6	R6-NQ 5 ft 50%	16				
130 -87.6	R7-NQ 5 ft 56%	9				
135 -92.6	R8-NQ 5 ft 28%	0				



PROJECT NUMBER: 338884.FL		BORING NUMBER: 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
 WATER LEVELS : 1.7 ft bgs on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
140 -97.6	R9-NQ 5 ft 30%	0	NR	129.05' - Fracture, 20 deg, smooth, undulating, tight 129.25' - Fracture, 10 deg, rough, undulating, open 1/8"-1/4" 129.4' - Fracture, 85 deg, smooth, undulating, dark staining, open 129.-129.75' - Fracture (2), 70 deg, smooth, undulating, dark staining, tight 129.85' - 70 deg, smooth, undulating, tight 130.0' - Fracture, 20 deg, smooth, undulating, tight, dark staining 130.05' - Fracture, 35 deg, smooth, undulating, tight 130.3-130.35' - Fractures (2), 15 deg, smooth, undulating, tight 133.5' - Fracture, 70 deg, smooth, undulating, black staining, open 133.65' - Mechanical break, horizontal, smooth, planar, tight, open 1/2" 133.8' - Fracture, 75 deg, smooth, undulating, tight to open 1/4" 134.05' - Mechanical break, horizontal, smooth, planar, open 134.25' - Fracture zone, up to 1"x1-1/2" fragments 134.5-134.65' - Fracture zone (2), up to 1"x1-1/2" fragments 138.4-138.7' - Fracture zone, up to 1"x2" fragments 138.95, 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" 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" 147.3' - 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 147.95-148.05' - 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, 50 deg, smooth, planar, heavy dark metallic staining, tight 151.35' - Fracture, 60 deg, smooth, undulating, dark metallic staining, open 151.5' - Mechanical break, 40 deg, rough, undulating to stepped, tight		No Recovery 134.8-138.4' Limestone 138.4-139.2' - pale yellowish brown to medium dark gray, (10YR 6/2 to N4), dark mottling, very fine to fine grained, medium strong (R3), voids (1/16") over 5-20% of surface, dissolution cavities (1.5"x1/4") over 5% of surface, mineralization (pyrite) mottling associated w/cavities 139.2-139.9' - very fine grained, trace voids (1/16"), no visible cavities or fossils No Recovery 139.9-143.4' Limestone 143.4-148.05' - light olive gray, (5Y 5/2), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), thin bedding, voids (1/16") over 5-40% of surface (varies with bedding), trace fossil casts (1/4"x1/8") concentrated at 144.4-145.3', 5% dissolution cavities at 143.4-143.7' and 144.2-145.3' No Recovery 148.05-148.4' Limestone 148.4-151.7' - yellowish gray to medium gray, (5Y 7/2 to N5), very fine to fine grained, mild HCl reaction, medium strong (R3), voids (1/16") over 10-25% of surface, dissolution cavities up to 1"x3" following 60-70% angle fracture pattern 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, trace fossil casts up to 1/4"x1/8", dissolution cavities up to 1-1/2"x1" 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 HCl reaction, medium strong (R3), voids (1/16") over 15-30% of surface (increasing percentage with depth), poorly fossiliferous, trace casts to 1/4"x2", trace cavities up to 1/4"x2" No Recovery 157.1-158.4'	R9: 15 minutes Driller's Remark: Continued circulation loss, potentially rock fragment jammed in core barrel shoe and unable to capture rock core Driller's Remark: End drilling for the day at 143.4' on 3/27/07 at 18:00 Water level at 2.4' below ground surface on 3/28/07 at 08:00 Driller's Remark: Retrieved 1.3' core from bottom of NQ bit Driller's Remark: Add <1 cup synthetic mud mix at 145.0' SC-2 collected at 144.5-145.3' R10: 35 minutes Driller's Remark: 2nd gear with 500psi down pressure, then switched to 3rd gear at 300psi for R11-NQ in order to decrease run time at 14:35 R11: 17 minutes
145 -102.6	R10-NQ 5 ft 93%	65	NR				
150 -107.6	R11-NQ 5 ft 92%	58	NR				
155 -112.6	R12-NQ 5 ft 73%	22	NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14	SHEET 9 OF 12
<h1>ROCK CORE LOG</h1>		

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
160 -117.6	R13-NQ 5 ft 98%	78		1	152.0' - Fractures, 80 deg, rough, undulating, dark metallic staining, intersecting, tight	Limestone 158.4-160.65' - light olive gray, (5Y 5/2), fine to coarse grained, mild to moderate HCl reaction, weak to moderate strong (R2 to R3), laminated bedding, voids (3/16") over 10-40% of surface (variable), trace fossil casts up to 1/8" diameter, cavities over 5-10% up to 1/4"x1/8", trace infill of weak rock (R2) dusky yellow (5Y 6/4); 160.65-160.85' weak rock (R2) moderate yellowish brown, voids (1/16") over 20-25% of surface 160.65-160.85' - moderate yellowish brown, (10YR 5/4), weak (R2), voids (1/16") over 15-25% of surface 160.85-163.3' - moderate yellowish brown, (10YR 5/4), voids (1/16") over 15-25% of surface, trace cavities (1/16"-1/2"), trace fossils (1/8"-1/4") No Recovery 163.3-163.4' Limestone 163.4-168.25' - grayish orange, (10YR 7/4), fine to coarse grained, mild to moderate HCl reaction, laminated bedding, alternating beds up to 1" thick, mottled with light olive gray (5Y 5/2), contains grayish orange beds that are weak rock (R2) and coarse grained, voids (3/16") over 10-40% of surface; light olive beds are medium strong rock (R3), fine grained, voids (1/16") over 5-15% of surface, fossil casts up to 1/4"x1/8" over 5-10% of surface from 167.0-168.25' No Recovery 168.25-168.4' Limestone 168.4-173.35' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), voids (1/16") over 15-25% of surface, void size increasing up to 3/16" with depth, trace dissolution cavities (up to 1-1/2"x1/8"), trace organic laminations No Recovery 173.35-173.4' Limestone 173.4-177.1' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), voids (3/16") over 15-25% of surface, trace cavities up to 1-1/2"x1/16", trace fossil casts up to 1/8"x1/16", trace laminations No Recovery 177.1-178.4'	Driller's Remark: Heavy chatter from 154.0-155.5', at 155.5' - cannot advance, removing casing to check bit, stop drilling on 3/28/07 at 16:10 at approximately 155' Water level at 2.1' below ground surface on 3/29/07 at 08:20 Water level at 2.7' below ground surface on 4/3/07 at 09:10 Water level at 2.8' below ground surface on 4/4/07 at 08:20 Water level at 7.6' below ground surface on 4/5/07 at 08:10, inside core barrel casing R 12: 25 minutes SC-3 collected at 161.35-162.4' R13: 17 minutes R14: 16 minutes R15: 17 minutes R16: 17 minutes
				4	152.25-153.0' - Fracture zone (2), up to 2"x2" fragments		
				2	153.4-153.55' - Fracture zone (2), up to 3/4"x1-1/4" fragments		
				1	153.7' - Fracture, 10 deg, smooth, undulating, light tan thin coating on surface, tight to open 1/4"		
				2	153.8' - Fracture, vertical, same as 153.7'		
					153.95-154.05' - Fracture zone (2), up to 1/2"x1" fragments		
					154.25' - Fracture, same as 153.7'		
					154.35' - Fracture, 30 deg, smooth, undulating, tight to open 1/4"		
					154.6' - Mechanical break, horizontal, rough, undulating, tight		
					155.1-155.15' - Fractures (2), 60 deg and 40 deg, rough, undulating, open		
					155.15-155.4' - Fracture zone (2), fragments up to 3/4"x1-1/2"		
					155.4' - Fracture, 75 deg, rough, undulating, dark staining		
					156.05-156.2' - Fractures (2), 70 deg and 55 deg, rough, undulating, tight to open 1/8"		
					156.6' - Fracture or mechanical break, vertical, rough, undulating, tight		
	156.65, 156.7, 156.8, 156.9' - Bedding plane or mechanical break (4), smooth, horizontal to 10 deg, planar to undulating, tight						
	156.9-157.1' - Fracture zone (2), up to 1/2"x1-1/2" fragments						
	158.4-158.55' - Fracture zone (2), up to 1"x2" fragments						
	158.55' - Fracture, 40 deg, rough, undulating, open						
	159.8-160.0' - Fractures (2), 30 deg, rough, undulating, tight						
	160.2' - 70 deg, same as 159.65'						
	160.65' - Fracture or bedding plane, horizontal, smooth, planar, tight						
	161.35-162.4' - Fractures (2), 20 deg, rough, undulating, tight						
	163.05' - Fracture, 20 deg, smooth, undulating, tight						
	163.65, 163.9, 164.0, 165.2, 165.05, 165.35, 165.45, 165.5, 165.55, 166.05, 166.45, 166.6, 166.9, 167.25' - Mechanical break (14), horizontal and 50 deg, smooth, planar, tight						
	163.8, 165.1, 165.6' - Fractures (3), rough, undulating, horizontal to 10 deg, tight						
	164.15' - Fracture, 60 deg, same as 163.8'						
	166.2' - Fracture, 60 deg, rough, undulating, tight						
	166.65' - Fractures (2), 30 deg, rough, undulating, intersecting fractures, tight						
	167.1-167.15' - Fractures (2), 40 deg and 70 deg, rough, undulating, tight						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 03/20/07 START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
180 -137.6	R17-NQ 5 ft 73%	22	>10	167.6-167.7' - Fractures (2), 40 deg and 70 deg, rough, undulating, intersecting, tight	Limestone 178.4-182.1' - Same as 173.4-177.1' except trace cavities up to 1-1/2"x1/4", dark discoloration associated with cavities No Recovery 182.1-183.4'	R17: 15 minutes		
			8	167.85-167.95' - Fractures (2), 30 deg and 70 deg, rough, undulating, intersecting, tight				
			0	168.55' - Fracture, 10 deg, rough, undulating, tight				
			5	169.05' - Fracture, 50 deg, rough, undulating, tight				
			NR	169.7' - Fracture, 60 deg, smooth, undulating to stepped, tight				
				170.15' - Fracture or mechanical break, 5 deg, smooth, stepped, open 1/8", dark staining				
183.4				170.55' - Fracture, 55 deg, rough, undulating, open 1/8"-3/4"				
			2	170.8' - Fracture zone, 3/4"x1-1/2" fragments				
			2	171.2' - Fracture, 20 deg, rough, undulating, tight				
185 -142.6	R18-NQ 5 ft 100%	77	2	171.35, 171.5, 171.8, 172.0, 172.45, 173.2' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight to open 1/8"			Limestone 183.4-188.4' - dark yellowish brown to pale yellowish brown, (10YR 4/6 to 10YR 6/2), fine to coarse grained, mild to moderate HCl reaction, medium strong (R3), abrupt color change at 184.45', voids (1/16" to 3/16") over 5-30% of surface, moderately fossiliferous, fossil casts up to 1"x1/2" over 5-10% of surface (percent increases with depth), trace cavities up to 1-1/4"x1/4" No Recovery 182.1-183.4'	SC-4 collected at 186.25-187.05' R18: 18 minutes
			5	172.1' - Fracture, 60 deg, rough, undulating, tight				
			4	172.4' - same as 172.1' except 30 deg				
			3	173.25' - same as 172.1' except vertical				
				173.4-174.4' - Fracture zone (2), 1-1/2"x2-1/2" fragments				
				175.2' - Fracture, 20 deg, smooth, undulating, tight to open 1/4"				
188.4			4	175.6' - Fracture zone, 1"x1/2" fragments				
			3	175.9' - Fracture, 30 deg, rough, undulating, tight				
			3	176.0-176.1' - Fracture zone (2), fragments up to 1"x1/2"				
190 -147.6	R19-NQ 5 ft 97%	67	3	176.3' - Fracture, 70 deg, rough, undulating, tight to open 1/4"	Limestone 188.4-193.25' - light olive gray to moderate yellowish brown, (5Y 5/2 to 10YR 5/4), fine to coarse grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 30% of surface, moderately fossiliferous from 188.4-190.1', poorly fossiliferous from 190.1-191.9', casts up to 1/2"x1/4", trace laminations, fine grained infill over 20-40%, trace cavities up to 1-1/2"x1/8", short (1/4"x1/2") stacked 60 deg fractures from 188.95-189.0' (micro structural feature) No Recovery 193.25-193.4'	Driller's Remark: Hard material, about 2" thick at 189.6' Driller's Remark: Hard material, about 2" thick R19: 14 minutes		
			3	176.4' - Fracture, horizontal, rough, undulating, tight				
			3	176.5' - Mechanical break, horizontal, smooth, planar, tight				
			2	176.6-177.1' - Fracture zone (2), up to 1-1/2"x1-1/2" fragments				
			NR	178.4-179.3' - Fracture zone (2), up to 1/2"x1-3/4" fragments				
			7	179.3' - Fracture, 40 deg, smooth, undulating, open				
			5	179.55' - Fractures (2), 20 deg and 10 deg, rough, undulating, open, intersecting				
			4	179.75' - Fracture, 50 deg, rough, undulating, tight				
			2	179.85' - Fracture, 40 deg, rough, undulating, open				
195 -152.6	R20-NQ 5 ft 98%	26	4	180.0' - Fracture, 20 deg, smooth, undulating to stepped, tight, dark staining				
			2	180.15' - Fracture, 10 deg, rough, undulating, open				
			6	180.33- 180.37' - Fractures (2), <10 deg, smooth, undulating, tight to open 1/2"				
				181.45' - Bedding plane, horizontal, smooth, planar, dark staining, tight				
198.4								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14	SHEET 11 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.6	R21-NQ 5 ft 63%	11	NR 3 2 >10 <10 NR		193.75-198.3' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine to coarse grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids up to 3/16" over 5-25% of surface increasing percentage with depth, trace fossil casts up to 1/4"x1/8", 196.4-197.7' has moderate coverage (15-10%) of cavities up to 1"x1/2", grain size coarsens with depth No Recovery 198.3-198.4' Limestone 198.4-199.9' - moderate yellowish brown, (10YR 5/4), medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 15-20% of surface, trace cavities up to 1/4" diameter, trace fossil casts up to 1/4"x1/3" 199.9-201.55' - grayish orange, (10YR 7/4), mild HCl reaction, medium strong (R3), trace voids up to 1/16" No Recovery 201.55-218.25'	R20: 14 minutes End drilling on 4/5/07 at 18:00 at 198.4' Water level at 3.3' below ground surface on 4/6/07 at 07:56 Begin coring at 08:00 Driller's Remark: Slow, hard coring from 201.0-201.5', rock core fragment was jammed inside shoe of core barrel! R21: 26 minutes R22: 15 minutes	
205 -162.6	R22-NQ 5 ft 0%	0	NR		181.65' - Fracture, 70 deg, smooth, planar to undulating, tight 181.7' - Bedding plane, horizontal, smooth, planar to stepped, open 181.8' - Mechanical break, hardness test 181.9' - Fracture, vertical, rough, undulating, tight 184.05, 184.2, 184.5, 185.6, 185.65, 185.7, 185.85, 186.25, 188.05' - Fractures or bedding plane (9), 5 deg, smooth, undulating, tight 185.7-185.85' - Fracture zone (2), up to 1-1/2"x2/3" fragments 187.05, 187.2, 187.35' - Fractures (3), 10 deg and 20 deg, rough, undulating, tight 187.25' - Fracture, vertical, rough, undulating, tight 188.4' - Fracture, 45 deg, rough, undulating, tight 188.5, 189.1, 189.2, 189.3, 189.55' - Bedding plane (5), horizontal, smooth, planar, open to tight 189.1-189.2' - Fracture zone (2), 1"x1-1/4" fragments 189.5' - Fracture, horizontal, smooth, planar 190.05' - Fracture, 10 deg, rough, undulating, tight 191.05-191.2' - Fractures (2), 30 deg and 60 deg, smooth, undulating, intersecting, tight 191.3' - horizontal, same as 190.05' 191.55' - Fracture, 65 deg, rough, undulating, tight 192.3' - same as 190.05' 192.95-193.15' - Fractures (2), 40 deg and 25 deg, smooth, undulating, intersecting, tight 193.75-193.85' - Fractures (2), smooth, planar, tight 193.8' - Fracture, 75 deg, smooth, planar, tight 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" fragments 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 1"x3/4" fragments 197.75' - Fracture, 70 deg, same as 195.45' 198.0' - <10 deg, same as 195.45' 198.3' - 70 deg, same as 195.45', open 198.6' - Fracture, 10 deg, rough, undulating, tight to open 1/4" 199.35-199.55' - Fractures (2), 40 deg, smooth, undulating, tight 199.85' - 60 deg, same as 198.85' 199.95-201.55' - Fracture zone (2), up to 1-3/4"x3" fragments	Driller's Remark: 1.2' slough at bottom of boring	
210 -167.6	R23-NQ 5 ft 0%	0	NR			R23: 15 minutes	
215 -172.6	R24-NQ 5 ft 3%	0	NR				



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.6	R25-NQ 5 ft 0%	0	NR	0	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 R25: 18 minutes	
223.4					Bottom of Boring at 223.4 ft bgs on 4/9/2007	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: 338884.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 LEVELS : 3.6 ft bgs on 6/13/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.2	0.0	1.3	SS-1	2-2-3 (5)	Silty Sand With Organics (SM) 0.0-0.55' - brownish black, (5YR 2/1), moist, loose, bark and root matter present, sand is light gray (N7), fine grained, silica, 22% fines Poorly Graded Sand (SP) 0.55-1.3' - pale yellowish brown to moderate yellowish 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	11:30 - Start sampling using AWJ rods, 2'x2" split spoon, drilling with 2-15/16" tri-cone bit Wet at 1'	
	1.5						
5 37.2	5.0	1.1	SS-2	1-1-0 (1)	Poorly Graded Sand (SP) 5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loose, very fine to fine grained, medium plasticity, 4% nonplastic fines, sand is silica		
	6.5						
10 32.2	10.0	0.3	SS-3	0-0-1 (1)	Clayey Sand (SC) 10.0-10.25' - light bluish gray, (5B 7/1), wet, very loose, no HCl reaction, 33% high plasticity fines, fine to coarse sand and fine gravel-sized limestone fragments that are yellowish gray (5Y 7/2) with strong HCl reaction	 Driller's Remark: Slight loss of circulation at 12'	
	11.5						
15 27.2	15.0	0.3	SS-4	50/5 (50/5")	Silt (ML) 15.0-15.33' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 3% fine sand, trace organics, all carbonate material	14:40 - 15' of HW casing installed 15:00 - Add bentonite chips around surface casing and borehole to prevent caving	
	15.4						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14A	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
 WATER LEVELS : 3.6 ft bgs on 6/13/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.2	20.0	1.0	SS-5	10-16-13 (29)	Silt With Sand (ML) 20.0-21.0' - grayish orange, (10YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 25% very fine to medium grained sand, coarse sand to fine gravel-sized lenses at 20.0-20.5', all carbonate material		
25	25.0	0.4	SS-6	50/4.5 (50/4.5")	Silt With Sand (ML) 25.0-25.4' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 15% fine sand sized, all carbonate material		
30	30.0	0.6	SS-7	14-5-9 (14)	Sandy Silt (ML) 30.0-30.6' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 40% fine to coarse sand sized, 10% fine gravel-sized grains, all carbonate		
35	35.0	0.3	SS-8	50/3.5 (50/3.5")	Silt And Limestone Fragments (ML) 35.0-35.3' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), wet, moderate to strong HCl reaction, 60% of sample is silt (similar to SS-7), 40% of sample is limestone fragments up to 1/4", all carbonate material Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log		16:10 - Recover SS-8, decide to start rock coring; add 20' HW casing to 34' (1' stickup) SS-8 may be slough/cuttings Borehole drilled from 35.3-36.0' without sampling to set stroke
40	35.3						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
36.0	R1-NQ 5 ft 100%	91	1	36.7' - Mechanical break or bedding plane, 10 deg, rough, undulating, tight to 1/4" open	Limestone 36.0-41.0' - light olive gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), 25% voids up to 1/16" increasing to 40% at 37.5', many oblong cavities (3/16" to 9/16") with trace recrystallization on inner surfaces, trace infill	Water level at 3.6' below ground surface on 6/13/07 at 07:30 Begin rock coring at 36' below ground surface 07:55 on 6/13/07 SC-1 collected at 36.7-37.85' R1: 11 minutes	
40 2.2			1				
			2	37.9' - Mechanical break or bedding plane, 10 deg, smooth to rough, undulating, tight			
			0	38.55, 38.9' - Mechanical break or fractures (2), 25 deg and 45 deg, rough, undulating, tight			
			0				
41.0	R2-NQ 5 ft 96%	84	0	41.0-43.8' - Same as 36.0-41.0' except very weak (R1) at 42.6-43.8'	43.8-45.8' - light olive gray, (5Y 7/2), fine to medium grained, extremely weak (R0), 60% voids up to 1/16" with some silt-sized infill and minor recrystallization, few black 1/16" diameter fossils, thin laminations of organic material from 45.65-45.8' No Recovery 45.8-46.0' Limestone 46.0-47.3' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCl reaction, very weak (R1), up to 1/16" voids over 40% of surface, trace black fragments at 46.1', some silt-sized infill, some recrystallization in void space, many (>5) black organic fragments up to 3/16" diameter 47.3-50.0' - Same as 46.0-47.3' except extremely weak (R0), with trace black fragments at 48.8' No Recovery 50.0-51.0' Limestone 51.0-53.35' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak (R0), 5-15% voids <1/16" on surface, trace 1/32" to 1/16" black laminations, many 1/16" black organic particles No Recovery 53.35-56.0'	R2: 6 minutes	
45 -2.8			2	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			
			1				
			2				
			0				
46.0	R3-NQ 5 ft 80%	53	NR	46.1, 46.5, 47.6, 47.8, 48.8, 49.15, 49.6, 49.9' - Bedding plane or mechanical break (8), <15 deg, smooth, undulating, tight to 1/4" open	Additional mechanical breaks created when placing core into box, due to rock conditions		
50 -7.8			2				
			2				
			3				
			NR				
51.0	R4-NQ 5 ft 47%	0	5	51.15, 51.4' - Fractures or mechanical break (2), 30 deg, smooth, planar to undulating, tight to 1/2" open	R3: 5 minutes		
			>10	51.75, 51.82' - Bedding plane (2), <10 deg, smooth, undulating			
			2	51.75-51.82' - Fracture, 85 deg, smooth, planar, extends between 2 bedding plane fractures			
			NR	52.0-52.3' - Fracture zone			
			NR	53.0, 53.15' - Bedding plane or mechanical break (2), 5 deg, rough, undulating			
55 -12.8						R4: 2 minutes	
56.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14A	SHEET 4 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
60 -17.8	R5-NQ 5 ft 0%	0	NR		No Recovery 56.0-61.0'	Driller's Remark: All sand/silt-sized particles fell out/washed out of core barrel during retrieval	
61.0							
65 -22.8	R6-NQ 5 ft 31%	0	NR		Limestone 61.0-62.55' - dusky yellow, (5Y 6/4), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), 40% surface voids up to 1/16", trace very thin (<1/32") black laminations at 61.25-61.3', oblong black material up to 1-3/16" x 1/16", spherical black material at 3/8" diameter, many cavities up to 3/8"x 3/16" No Recovery 62.55-66.0'	Driller's Remark: Fragments/pieces of rock could be felt at 59.0' R5: 2 minutes	
66.0						R6: 2 minutes	
70 -27.8	R7-NQ 5 ft 75%	14	NR		Limestone 66.0-69.75' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, weak (R2), 30% surface voids <1/16" diameter many cavities up to 3/8"x3/16", minor recrystallization, trace black laminations up to 3/16" thick, trace black organic material up to 5/16" diameter moderately fossiliferous (molds, casts) No Recovery 69.75-71.0'	09:50 Driller's Remark: Hole started caving due to loose interval at 56.0-61.0', installed HW casing from 35.0-60.0'	
71.0						11:20 Casing installed, borehole flushed	
75 -32.8	R8-NQ 5 ft 62%	22	NR		Limestone 71.0-72.15' - Same as 66.0-69.75' except very weak (R1), 40% surface voids <1/16" 72.15-74.1' - Same as 66.0-69.75' except extremely weak (R0), 5% surface voids <1/16" No Recovery 74.1-76.0'	R7: 5 minutes	
76.0						R8: 4 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-14A	SHEET 5 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
80 -37.8	R9-NQ 5 ft 80%	0	1 2 >10 1 NR	76.55' - Mechanical break 76.9-77.05, 77.25-77.43' - Fracture zone, sand to gravel-sized limestone fragments 78.05' - Bedding plane, 5 deg, rough, stepped, up to 1/4" open 78.15' - Bedding plane, horizontal, rough, stepped, up to 3/4" open 78.25-78.5, 78.7-78.8' - Fracture zone 79.65' - Mechanical break, <15 deg, rough, stepped	[Symbolic Log]	Limestone 76.0-80.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), 50% surface voids <1/16", many (5+) cavities, few large cavities up to 1-3/16"x5/16", minor silt-sized infill, minor recrystallization, trace black fossil casts, poorly fossiliferous, zone from 77.95-78.75' is weak rock (R2), 5% surface coverage of voids <1/16" with minor recrystallization No Recovery 80.0-81.0'	Driller's Remark: Slight mud loss at 80.0' R9: 5 minutes
85 -42.8	R10-NQ 5 ft 84%	34	>10 3 >10 0 1 NR	81.1' - Fracture, horizontal, smooth, planar, black organic infill or staining 81.3-81.75' - Fracture zone, angular rock fragments 81.7' - Fractures (2), 60 deg and 45 deg, smooth, stepped, intersecting, tight 81.85' - Fracture, vertical, rough, undulating, 1/8" open 82.5, 82.65, 83.4, 83.55' - Fracture (4), 50 deg, rough, undulating to stepped, tight to 1/4" open 83.0-83.2, 83.76-83.95' - Fracture zone 84.1' - Fracture, 45 deg, rough, stepped	[Symbolic Log]	Limestone 81.0-81.4' - very pale orange, (10YR 8/2), fine grained, very weak (R1), laminated bedding, 3/4" black organic layer at 81.0' 81.4-82.9' - pale olive, (10Y 6/2), weak to medium strong (R2 to R3), 20-25% coverage of surface voids up to 1/16", fossiliferous 82.9-83.6' - grayish orange, (10YR 7/4), fine grained, moderate to strong HCl reaction, very weak (R1) 83.6-85.2' - yellowish gray, (5Y 7/2), medium strong (R3), 20-25% voids up to 1/16" over surface, 1-2% fossil molds up to 5/16" No Recovery 85.2-86.0'	R10: 5 minutes
90 -47.8	R11-NQ 5 ft 60%	40	3 1 1 NR	86.4-86.6' - Fracture zone, bound by 45 deg fractures, rough, undulating 87.1' - Fracture, 75 deg, smooth, undulating 87.3' - Bedding plane, horizontal, rough, undulating, bedding plan splits into 45 deg fractures above and below 88.4' - Mechanical break, smooth, stepped, tight	[Symbolic Log]	Limestone 86.0-89.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), 15-20% surface coverage of voids up to 1/8", <2% surface coverage of cavities/molds up to 3/8" (1"x2" cavity at 88.9'), sparse soft white infilling in some of the larger molds No Recovery 89.0-91.0'	SC-2 collected at 87.3-88.35' R11: 9 minutes
95 -52.8	R12-NQ 5 ft 82%	7	3 2 >10 2 1 NR	91.1, 91.4' - Bedding plane (2), <10 deg, smooth, undulating 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 at 92.2' 92.9' - Mechanical break, horizontal, smooth, undulating, tight 93.0-93.33' - Fracture zone 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, rough, planar to stepped	[Symbolic Log]	Limestone 91.0-91.7' - Same as 86.0-89.0' 91.7-95.1' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCl reaction, extremely weak (R0), 5-10% surface coverage of voids <1/16", trace black oblong material up to 3/8"x1/16", minor recrystallization No Recovery 95.1-96.0'	Driller's Remark: Slight mud loss at 92.0', lost circulation completely at 93.0' R12: 7 minutes
96.0					[Symbolic Log]		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100-57.8	R13-NQ 5 ft 86%	18	5	94.5, 94.8, 95.0' - Bedding plane (3), <10 deg, rough, undulating, black staining at 94.5', tight to 1/4" open 96.1' - Bedding plane, horizontal, smooth, undulating 96.4' - Fracture, 55 deg, smooth, undulating, tight 96.7-96.95' - Fracture zone 97.5' - Fracture or mechanical break, 40 deg, rough, undulating, tight 97.85, 98.3' - Bedding plane (2), horizontal, rough, undulating, tight 98.0' - Fracture, 80 deg, smooth to rough, undulating, with fragments along length from 97.55-98.5'	[Symbolic Log]	Limestone 96.0-97.8' - light olive gray grading to yellowish gray, (5Y 5/2 to 5Y 7/2), fossiliferous (molds/casts), voids up to 1/16" over 10-15% of surface, 1-2% coverage of molds/casts up to 3/8" diameter 97.8-100.3' - yellowish gray, (5Y 5/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 15-30% surface coverage of voids up to 1/8", few large cavities up to 3/8", fossiliferous (molds) No Recovery 100.3-101.0'	R13: 7 minutes
105-62.8	R14-NQ 5 ft 58%	16	1	98.5, 98.7' - Fracture (2), 50 deg, smooth, stepped, V-shaped fractures 98.8, 99.2, 99.4' - Bedding plane or mechanical break (3), horizontal 99.4-99.5' - Fracture zone 99.5' - Bedding plane, horizontal, rough, planar 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 101.9-102.45' - Fracture zone 102.7' - Fracture, rough, undulating, conchoidal fracture plane, 1/4" open 102.9, 103.1' - Fractures (2), 50 deg, smooth, stepped		[Symbolic Log]	Limestone 101.0-103.9' - Same as 97.8-100.3' No Recovery 103.9-106.0'	R14: 9 minutes
110-67.8	R15-NQ 5 ft 90%	37	>10	103.25-103.9' - Fracture zone 103.55' - Fracture, 45 deg, smooth, planar 106.0-106.7' - Fracture zone 106.8, 107.2' - Fractures (2), 70 deg, rough, stepped, tight to 1/8" open 107.05, 107.3' - Bedding plane (2), horizontal, rough, undulating 107.4-107.9' - Fracture zone 107.9, 108.2' - Fractures (2), 60 deg, rough, undulating to stepped, up to 3/4" open 109.2' - Mechanical break, 65 deg 110.2' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight to 1/2" open	[Symbolic Log]		Limestone 106.0-110.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), 25% voids <1/16" on surface, 5+ cavities up to 3/4"x1/4", faint horizontal white and black bands throughout core No Recovery 110.5-111.0'	16:00 - Reached total depth of 111.0' R15: 10 minutes
							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: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
42.5							Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels not recorded during drilling
5	4.5						
37.5	1.5	SS-1	3-3-4 (7)	Poorly Graded Sand (SP) 4.5-6.0' - grayish orange pink, (5YR 7/2), wet, loose, very fine to fine grained, no HCl reaction, 20% fine organics, trace nonplastic fines, trace fine rounded gravel, silica sand			
	6.0						
10	9.5						
32.5	1.0	SS-2	6-6-8 (14)	Poorly Graded Sand (SP) 9.5-10.5' - pinkish gray, (5YR 8/1), wet, medium dense, very fine to fine grained, no HCl reaction, trace nonplastic fines, trace black minerals, silica sand			
	11.0						
15	14.5						
27.5	0.9	SS-3	3-3-2 (5)	Poorly Graded Sand (SP) 14.5-15.4' - Same as 9.5-10.5' except loose			
	16.0						
	19.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.5	1.1	SS-4	1-1-0 (1)	Poorly Graded Sand (SP) 19.5-20.35' - Same as 14.5-15.4'		Weight of hammer drove last 6"
21.0				Sandy Lean Clay (CL) 20.35-20.6' - light olive gray, (5Y 5/2), moist, very soft, low to medium plasticity, slow dilatancy, no HCl reaction, 35-40% very fine to fine silica sand		
25	1.5	SS-5	2-1-1 (2)	Clayey Sand (SC) 24.5-26.0' - very pale orange, (10YR 8/2), moist, very loose, very fine to fine grained, no HCl reaction, 27% fines, fat clay interbeds 1/8"-5/8" thick at 24.6', 24.8', 25.2', 25.5', 25.85' and 25.95' (olive gray [5Y 4/1], moist, very soft, high plasticity, no dilatancy)		
30	1.2	SS-6	18-19-13 (32)	Silt With Sand (ML) 29.5-30.7' - grayish orange, (10YR 7/4), moist, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 19% fine to medium sand sized, carbonate		
35	1.1	SS-7	21-42-50/4 (92/10")	Silt With Sand (ML) 34.5-35.6' - dark yellowish orange, (10YR 6/6), moist, hard, mild to moderate HCl reaction, 10-25% very fine to medium sand-sized (varies in sample), laminated beds of white at 35.1' and 35.3-35.6', all carbonate		
40	0.0	SS-8	50/1.5 (50/1.5")	Limestone Fragments 39.5' - olive gray, (5Y 3/2), voids over 80-90% of surface, mild HCl reaction on unscratched surface, moderate HCl reaction when scratched		Switch to rock coring at 40'
				Begin Rock Coring at 40.0 ft bgs See the next sheet for the rock core log		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15	SHEET 3 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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
2.5	R1-NQ 2 ft 95%	70	3	40.0-40.2' - Fracture zone	Limestone 40.0-41.9' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, medium strong to strong (R3 to R4), fossiliferous (casts) voids 60-70% coverage, few cavities up to 1/16" No Recovery 41.9-42.0' Limestone 42.0-47.0' - Same as 40.0-41.9' except many cavities up to 1/4", voids (1/16") up to 60% coverage, very weak (R1) below 46.0'	Begin rock coring at 40' Core run times were not recorded at the time of drilling		
			0	40.35' - Fracture, vertical, rough, planar, tight 40.5' - Fracture, 10 deg, rough, undulating, open				
42.0	NR	0						
	R2-NQ 5 ft 100%	60	4	43.3-43.4' - Fracture zone, rock fragments, coarse sand (1/16") to gravel (1") size				
			6	44.1' - Fracture, 5 deg, rough, undulating, open 44.25, 44.4' - Fracture (2), 88 deg and vertical, rough, planar, tight				
45			5	44.5, 44.6' - Fractures (2), 10 deg, rough, undulating, <1" relief				
-2.5			2	44.85, 45.35' - Fractures (2), 40 deg, rough, planar, tight 45.55-45.7' - Fracture zone, rock fragments from fine gravel (3/16") to coarse gravel (1"x2") size				
			NA	46.6' - Mechanical break 46.9' - Fracture zone, 10 deg, smooth, undulating, 1-1/4" relief				
50	R3-NQ 5 ft 62%	0	NR	47.0-50.1' - Fracture zone, sandy silt, mostly loose indurated material, fractures very easily, some fractures may be mechanical			Sandy Silt (SM) 47.0-50.1' - light olive gray, (5Y 5/2), wet, 20-25% very fine to coarse grained sand, trace gravel-sized limestone fragments, thin (1/16-1/8") organic layers throughout (30% coverage), section compacted at 49.0-50.0' with no cementation No Recovery 50.1-52.0'	
-7.5								
52.0	R4-NQ 5 ft 84%	20	>10	52.0-57.0' - Fractures or mechanical break, mostly mechanical breaks due to soft material, partially lithified compacted fragments from silt to coarse sand, up to 1" sections	Limestone 52.0-53.8' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, very weak (R1), black organic fragments (1/16"x3/16") distributed throughout the rock (<5%), generally horizontal orientation, poorly fossiliferous 53.8-55.0' - moderate olive brown, (5Y 4/4), fine grained, strong HCl reaction, very weak (R1), (<1/16") voids about 70% of surface, poorly fossiliferous, black organic fragments as for 52.0-53.8' above, but more (still <5%) 55.0-56.2' - Same as 52.0-53.8' except more abundant black organics No Recovery 56.2-57.0'	Loggers: A. Teal/ C. Dougherty		
			2	54.0' - Fracture, horizontal, rough, undulating, 3/8" relief 54.4' - Fracture, 3/16" open				
55			>10					
-12.5			0					
			NR					
57.0	R5-NQ 5 ft 100%	80	4	57.25' - Fracture, 15 deg, smooth, undulating, <1" open				
			0	57.5, 60.8' - Fractures (2), 20 deg, rough, undulating, open 57.8' - Fracture, 10 deg, smooth, planar, tight, lignite lamination 3/8" thick				
60			1	57.95' - Fracture, 60 deg, rough, undulating to planar, tight				



PROJECT NUMBER: 338884.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)
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-17.5			3	58.3, 58.7, 59.1, 59.7, 61.1' - Mechanical break (5)		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 HCl 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'	
62.0		2	59.4' - Fracture, 10 deg, smooth, undulating, tight 60.5' - Fracture, 10 deg, rough, undulating 61.7' - Fracture, 5 deg, smooth, undulating, <1" relief					
	R6-NQ 5 ft 28%	0	5	62.0' - Fracture, 15 deg, rough, undulating, open, 1-1/4" relief				
65		NR	0	62.1, 62.3, 62.4, 62.5' - Fracture zone (4), 10 deg, smooth, undulating, open 62.15' - Fracture, 25 deg, rough, undulating, <1" relief 62.5-63.4' - Fracture zone, soft, partially lithified limestone fragments				
-22.5								
67.0			3	67.2, 67.4' - Fractures (2), 15 deg, rough, undulating, open 67.3' - Fracture, 30 deg, rough, undulating, open 68.4' - Fracture, 70 deg, rough, planar, tight		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 HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 75% of surface, few black organic fragments No Recovery 76.3-77.0' Limestone 77.0-79.4' - Same as 74.7-76.3'	SC-1 collected at 77.0-77.85'	
	R7-NQ 5 ft 88%	46	1	69.4, 69.7' - Fractures (2), 10 deg, rough, undulating, tight, open at 69.7'				
70			3	69.5, 70.0' - Fractures (2), 80 deg and vertical, rough, planar, tight				
-27.5			>10	70.2-72.0' - Fracture zone, soft, partially lithified limestone fragments				
			>10					
			NR					
			>10	72.0-72.6' - Fracture zone, limestone fragments from silt to gravel-sized				
			1	73.4, 75.2' - Mechanical break				
	R8-NQ 5 ft 86%	68	0	73.9' - Fracture, 60 deg, rough, planar, tight				
75			0					
-32.5			1	76.3' - Fracture, 5 deg, rough, undulating, tight				
			NR					
			1					
			1	77.85' - Fracture, horizontal, smooth, undulating, tight				
	R9-NQ 5 ft 78%	70	>10	78.65' - Fracture, 10 deg, rough, undulating, tight 79.2-79.4' - Fracture zone, limestone fragments, gravel to cobble-sized				
80								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15
SHEET 5 OF 11	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION	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.	
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-37.5			0	79.8, 78.3, 80.4' - Mechanical break (3)	□	Limestone 79.4-80.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 80% of surface, few larger (up to 3/16") voids, moderately fossiliferous	Many of the fragments at 82.0-82.5' show tooling marks from drilling; fragmentation could be result of drilling	
82.0		NR			□	No Recovery 80.9-82.0'		
85	R10-NQ 5 ft 94%	30	>10	82.0-82.5' - Fracture zone, limestone fragments, coarse sand cobble-sized 82.65' - Fracture, 60 deg, smooth, undulating, open 83.35' - Fracture, 25 deg, rough, undulating, open 83.7, 84.0, 84.1, 84.15' - Bedding plane (4), organic beds, black, thin laminations 84.4-85.3' - Fracture zone, limestone fragments from silt to cobble-sized	□	82.0-86.7' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 80% of surface, moderately fossiliferous, zones at 83.7-84.0' and 86.3-86.7' have few voids, black organic laminations (20%), and color closer to yellowish gray 5Y 7/2		
-42.5			2	85.75' - Fracture, 25 deg, rough, undulating, tight	□			
87.0			NR	86.0, 86.2' - Fractures (2), 30 deg, rough, undulating, 2-1/2" relief at 86.0', open at 86.2'	□	No Recovery 86.7-87.0'		
85			3	87.1, 87.15' - Fractures (2), 5 deg and 10 deg, smooth, undulating, open	□	Limestone 87.0-90.95' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 85% of surface (only 30% below 90.3'), larger (up to 3/8") voids over <5% of surface with most between 89.0 -90.3', larger voids are fossil molds, moderately fossiliferous		
85			2	87.45-87.75' - Fracture zone, limestone fragments, gravel to cobble-sized	□			
90	R11-NQ 5 ft 79%	46	3	88.0, 89.0' - Fractures (2), 20 deg and 10 deg, rough, undulating, open	□			
-47.5			3	88.45' - Fracture, 70 deg, smooth, planar, tight	□	No Recovery 90.95-92.0'		
92.0			NR	89.2, 90.4' - Fractures (2), 40 deg and 20 deg, rough, undulating, open at 89.2', 2-1/2" relief at 90.4' 89.45' - Fracture, 70 deg, rough, planar, open 89.8, 90.0' - Mechanical break (2)	□			
95			3	92.2' - Fracture, 75 deg, smooth, planar, open	□	Limestone 92.0-96.6' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 30% of surface, few larger (up to 3/8") voids, poorly to moderately fossiliferous, rock appears to continue from material at 90.3 -91.0', some organic laminations below 96.0', also more abundant fossils		
-52.5	R12-NQ 5 ft 92%	49	3	92.75, 92.95' - Fractures (2), 20 deg, smooth, undulating, tight	□			
95			3	93.0' - Fracture, vertical, smooth, planar, tight	□			
97.0			NR	93.2, 93.4' - Fractures (2), 20 deg, smooth, undulating, open at 93.2', tight at 93.4' 93.7' - Mechanical break	□			
95			0	94.0' - Fracture, 70 deg, rough, planar, open	□			
95			4	94.2, 94.35' - Fractures (2), 15 deg, rough, undulating, open	□			
100	R13-NQ 5 ft 100%	60	2	97.3' - Fracture, 20 deg, rough, undulating, <1" relief	□	No Recovery 96.6-97.0'		
100			2	97.95-98.3' - Fracture zone, 60 deg, smooth, planar, tight/multiple fractures	□	Limestone 97.0-97.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), matrix with abundant voids (<1/16"), very fossiliferous at 97.3-97.5', yellowish gray (5Y 7/2) fragments held in matrix have few voids		
100			2	98.6' - Fracture, horizontal, rough, undulating, open 99.3' - Fracture, 10 deg, rough, undulating, 2-1/2" relief	□			



PROJECT NUMBER: 338884.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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-57.5			1	99.9' - Fracture, 50 deg, rough, planar, tight 100' - Fracture, 75 deg, rough, planar, tight 100.5' - Fracture, 45 deg, rough, undulating, open	Limestone 97.5-98.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), few voids 98.3-102.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 85% of surface, few larger (up to 3/8") voids, few organic laminations, moderately fossiliferous 102.0-106.6' - Same as 98.3-102.0' except area of intermixed material (yellowish gray 5Y 7/2, with few voids) from 102.3-103.3', larger voids (up to 3/8") and fossil molds/casts more common, zone from 104.0-104.5' appears more moderate olive brown (5Y 4/4) in color No Recovery 106.6-107.0' Limestone 107.0-111.8' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), voids (<1/16") over 80% of surface, larger (up to 3/8") voids and fossil molds/casts cover up to 5% of surface, moderately fossiliferous, particularly at 107.8-109.5' No Recovery 111.8-112.0' Limestone 112.0-117.0' - Same as 107.0-111.8' except medium strong (R3) 117.0-118.7' - Same as 112.0-117.0'	Bioturbation zones are highly HCl reactive, matrix has slow to moderate HCl reaction SC-3 collected at 105.75-106.6' SC-4 collected at 110.35-111.35' SC-5 collected at 117.7-118.7'	
102.0		1	101.6' - Fracture, 70 deg, rough, undulating, 1-1/4" relief 101.65' - Fracture, 25 deg, rough, undulating, tight 102.25, 102.7' - Fractures (2), 30 deg and 10 deg, rough, undulating, open 102.4' - Fracture, 70 deg, smooth, planar, tight 103.2' - Fracture, 5 deg, smooth, undulating, tight 103.5' - Fracture, 40 deg, rough, undulating, 3-1/2" relief 103.8' - Fracture, 40 deg, smooth, planar, tight 104.2' - Fracture, 25 deg, smooth, undulating, open 104.2-104.7' - Fracture zone, cobble-sized rock fragments 105.75' - Fracture, 60 deg, rough, stepped, 3-1/2" relief 106.6' - Fracture, 15 deg, rough, undulating, open 107.7, 109.4' - Fracture (2), 25 deg, rough, undulating, 2-1/2" relief for 107.7', open for 109.4' 108.0, 108.5' - Fractures (2), 35 deg, rough, undulating, tight for 108.0', open for 108.5' 109.7' - Fracture, 20 deg, rough, undulating, open 109.85' - Mechanical break 110.35, 111.35' - Fractures (2), 40 deg and 5 deg, rough, undulating, tight for 110.35', open for 111.35' 111.6' - Fracture, 15 deg, smooth, undulating, open 112.0-112.5' - Fracture zone, limestone fragments, gravel to cobble-sized 112.8, 113.2' - Fractures (2), 70 deg, smooth, planar, open 113.2, 113.5' - Fractures (2), 10 deg and 15 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 20 deg, rough, undulating, open 114.0' - Fracture, 30 deg, rough, undulating, tight 114.1' - Fracture, 40 deg, smooth, undulating, tight 114.9, 115.0' - Fractures (2), 50 deg, smooth, planar, tight 115.2, 115.6' - Fracture (2), 60 deg, smooth, planar, tight 115.45' - Fracture, 25 deg, smooth, undulating, tight 115.7' - Fracture, 30 deg, smooth, undulating, open				
105	R14-NQ 5 ft 92%	51	2				
62.5			1				
			1				
			NR				
			1				
			2				
			2				
110	R15-NQ 5 ft 96%	86	1				
67.5			2				
			NR				
			2				
			5				
			3				
115	R16-NQ 5 ft 100%	44	6				
72.5			0				
			4				
			1				
			3				
120	R17-NQ 5 ft 94%	62					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-77.5	122.0	R18-NQ 5 ft 46%	9	3	115.75' - Fracture, 5 deg, rough, undulating, open	Limestone 118.7-120.7' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 60% of surface, few larger (up to 3/16") voids, gradual color change to dusky yellow (5Y 6/4) at bottom foot of interval 120.7-121.7' - mottled dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 80% of surface of yellow-colored areas and 30% in gray areas No Recovery 121.7-122.0' Limestone Fragments 122.0-124.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to strong HCl 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 HCl reaction No Recovery 124.3-132.0'	
1				117.25, 117.30, 119.1' - Fractures (3), 25 deg, smooth, undulating, tight for 117.25' and 117.30', open for 119.1'			
NR				117.6, 119.3' - Fractures (2), 5 deg, smooth, undulating, tight for 117.6', open for 119.3'			
>10				117.7, 118.7' - Fractures (2), 45 deg, smooth, planar, tight			
>10	119.25' - Fracture, 20 deg, smooth, undulating, tight						
>10	120.1' - Fracture, 15 deg, smooth, undulating, open						
NR	120.8, 120.9' - Fractures (2), 30 deg and 45 deg, smooth, planar, tight						
NR	121.2' - Fracture, 25 deg, smooth, undulating, open						
NR	122.0-124.3' - Fracture zone or mechanical break, fragmented						
125 -82.5	127.0	R19-NQ 5 ft 0%	0	NR			
130 -87.5							
132.0	132.0	R20-NQ 5 ft 72%	19	3	132.0-132.2' - Fracture zone, gravel-sized limestone fragments	Limestone 132.0-133.4' - light olive gray grading to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 30% of surface, larger (up to 3/8") voids and fossils molds/casts over 5% of surface, laminated coloration and few voids from 132.7-133.2' 133.4-135.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 80% of surface, larger (up to 3/8"x3/4") voids and fossil molds over 10% of surface 135.0-135.6' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 5% of surface, laminated coloration, some laminations of organic material No Recovery 135.6-137.0'	
135 -92.5				5	132.35' - Fracture, 5 deg, rough, undulating, open		
135 -92.5				4	132.85' - Fracture, 5 deg, smooth, planar, open		
135 -92.5				4	133.0, 133.3' - Fractures (2), 40 deg and 5 deg, smooth, planar, open for 133.0', very tight for 133.3'		
135 -92.5				NR	133.05, 133.35' - Fractures (2), 5 deg, smooth, planar, very tight		
135 -92.5				NR	133.5, 134.55' - Fractures (2), 5 deg and 15 deg, rough, undulating, open		
137.0	137.0	R21-NQ 5 ft 84%	50	4	134.0, 134.25' - Fractures (2), horizontal, rough, undulating, open		
137.0				4	134.7' - Fracture, 10 deg, smooth, undulating, open		
137.0				2	135.0' - Fracture, 5 deg, rough, undulating, open		
137.0				4	135.0-135.2' - Fracture zone, limestone fragments, gravel to cobble-sized		
140				4	135.3' - Fracture, horizontal, smooth, planar, very tight		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15	SHEET 8 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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-97.5			1	135.5' - Fracture, 5 deg, smooth, undulating, open		Limestone 137.0-137.6' - Same as 135.0-136.6' except light colored (dusky yellow (5Y 6/4)) laminations have increasing amount of voids 137.6-141.2' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (<1/16") over 75% of surface decreasing to 40% below 139.5', moderately fossiliferous, molds up to 3/16"x9/16", few black organic laminations at 138.5-139.8', few inclusions (3/16"x3/4") of grey limestone material at 138.0' and 139.9' No Recovery 141.2-142.0' Limestone 142.0-144.0' - mottled medium light gray and yellowish gray, (N6, 5Y 7/2), fine grained, moderate HCl reaction, yellowish gray is in bands around cavities, few voids (<1/16"), several larger (up to 3/8") voids and fossil molds 144.0-145.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") 30% coverage, larger voids (up to 3/4") 15%, organic material on irregular bedding plane and fracture surfaces, moderately to very fossiliferous, gradational contact with material below 145.5-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), few voids (1/16"), no larger voids, organic lamination No Recovery 146.7-147.0' Limestone 147.0-151.4' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 30% of surface, more abundant in zone from 147.3-148.8' and 150.0-151.0', fossiliferous in same zones, black staining is on uneven and irregularly laminated bedding at 148.1-148.8', clasts (up to 3/8"x1-3/16") of yellowish gray (5Y 7/2) limestone without voids appear imbedded in the core from 147.0-148.0', coloration on bedding ranging from light olive gray (5Y 5/2) to dusky yellow (5Y 6/4) No Recovery 151.4-152.0'	SC-6 collected at 143.0-144.0'	
142.0			2	137.3' - Fracture, vertical, rough, planar, tight				
			NR	137.6' - Fracture, horizontal, smooth, undulating, open				
			>10	137.8, 138.15' - Fractures (2), 5 deg, rough, undulating, tight				
			>10	137.9, 138.6' - Fractures (2), 15 deg and 70 deg, rough, undulating, open, gray staining at 138.6'				
			>10	139.0, 139.55' - Fractures (2), 70 deg and 15 deg, rough, undulating, open, gray staining				
			>10	139.2' - Fracture, 50 deg, rough, planar, open, gray staining				
			3	139.9, 141.1' - Fractures (2), 5 deg, smooth, undulating, tight				
			2	140.45, 141.25' - Fractures (2), 30 deg and 20 deg, rough, undulating, open				
			NR	142.0-143.0, 144.0-145.1' - Fracture zone or mechanical break (2), sections crushed, limestone fragments from gravel to cobble-sized				
			3	145.2' - Fracture, 60 deg, rough, undulating, open				
			2	145.3, 145.5' - Fractures (2), 15 deg, rough, undulating, open, moderate yellowish brown (10Y 5/4) to dusky brown (5Y 2/2) staining				
			4	145.9' - Mechanical break				
			6	146.6, 146.9' - Fractures (2), horizontal and 50 deg, smooth, planar, tight				
			2	147.30, 147.6' - Fractures (2), 60 deg, smooth, planar, tight				
			NR	147.35' - Fracture, 20 deg, smooth, undulating, open				
			1	148.22' - Fracture, 5 deg, smooth, planar, tight, moderate yellowish brown (10Y 5/4) to dusky brown (5Y 2/2) staining				
			0	148.4' - Fracture, 15 deg, rough, undulating, open, partial coverage up to 20% of moderate yellowish brown (10Y 5/4) to dusky brown (5Y 2/2) staining				
			2	149' - Fracture, 70 deg, rough, planar, open				
			2	149.3' - Fracture, 20 deg, rough, undulating, open				
			2	149.4, 149.6' - Fractures (2), 75 deg, rough, planar, tight				
			2	150' - Fracture, 60 deg, rough, planar, tight				
			1	150.1' - Fracture, 60 deg, slickensided, planar, very tight, light to dark brown staining (possibly hematite)				
			1	150.6' - Fracture, 50 deg, smooth, undulating, open				
			3	150.65, 150.8' - Fractures (2), 30 deg and 10 deg, smooth, undulating, tight				
			1	150.9' - Fracture, 40 deg, smooth, undulating, tight				
			1	151.3, 151.5' - Fractures (2), 5 deg and 35 deg, smooth, undulating, open				
			2	152.0-152.9' - Fracture zone, limestone fragments, gravel to cobble-sized				
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PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15	SHEET 9 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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-117.5			1	152.9' - Fracture, 5 deg, smooth, undulating, open	Limestone 152.0-155.7' - Same as 147.0-151.4' except fewer (now 10%) voids (<1/16") covering surface, thin bedding from 153.5-155.0', uneven and irregular laminations from 155.2-155.7' 155.7-157.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), few (<5%) voids or fossil molds/casts, thin bedding (1/4") from 155.7-157.0', olive gray (5Y 3/2) coloration along healed fracture at 156.8-157.0' 157.0-157.4' - Same as 155.7-157.0' 157.4-158.8' - fragments of light olive gray (35%) and yellowish gray (15%) in a dusky yellow matrix (50%), (5Y 5/2 and 5Y 7/2 in 5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 50% of matrix area but only 10% of other areas, larger (up to 3/16"x3/8") voids and fossil casts/molds over 5% of area overall 158.8-160.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, strong (R4), voids (<1/16") over 5% of surface, mainly in thin (1/2") zones, thinly bedded, few fossil casts 160.0-162.0' - mottled light olive gray and dusky yellow, (5Y 5/2 and 5Y 6/4), fine grained, moderate to mild HCl reaction, medium strong to strong (R3 to R4), voids (1/16") cover 70% of surface, few large voids, fragments of other limestone material imbedded in dusky yellow matrix below 161.0' 162.0-166.2' - moderate olive brown grading to light olive gray by 165.0', (5Y 4/4 to 5Y 5/2), fine grained, moderate to mild HCl reaction, strong (R4), voids (1/16") only 5% from surface area except zones from 163.0-163.3' and 165.4-166.0', few larger voids (up to 3/16") below 165.4', uneven and disturbed bedding below 165.6' No Recovery 166.2-167.0' Limestone 167.0-167.9' - Same as 162.0-166.2' except presence of breccia (1" fragments) at 167.3-167.9' 167.9-169.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, medium strong (R3), voids (<1/16") over 80% of surface		
			3	154.4' - Fracture, 45 deg, rough, planar, tight 154.9, 156.7, 156.9' - Mechanical break (3) 155.2' - Fracture, 10 deg, smooth, undulating, open			
162.0			1	155.7' - Fracture, horizontal, smooth, planar, tight			
			5	156.5' - Fracture, 30 deg, rough, undulating, open			
			3	157.2' - Fracture, 75 deg, rough, planar, open 157.4' - Fracture, 20 deg, rough, undulating, open			
165	R26-NQ 5 ft 84%	32	2	157.8, 158.4' - Fractures (2), 25 deg and 10 deg, rough, undulating, tight for 157.8', open for 158.4'			
-122.5			4	158.4-159.0' - Fracture zone, limestone fragments, gravel to cobble-sized			
			NR	159.5- 159.7' - Fracture zone, limestone fragments, gravel to cobble-sized			
			0	159.5' - Fracture, 5 deg, smooth, planar, tight 159.9, 160.4' - Fractures (2), 40 deg, smooth, undulating, tight			
			0	161.0' - Fracture, 15 deg, smooth, undulating, open			
			2	161.2' - Fracture, 85 deg, smooth, planar, tight			
170	R27-NQ 5 ft 100%	62	2	161.3' - Fracture, 20 deg, smooth, undulating, open			
-127.5			2	161.3-162.0' - Fracture, limestone fragments, gravel to cobble-sized			
			0	162.4, 163.15' - Fractures (2), 10 deg and 25 deg, rough, undulating, open			
			0	163.0' - Fracture, 20 deg, smooth, planar, tight			
			6	163.15-164.2' - Fracture zone, limestone fragments, gravel to cobble-sized			
			>10	164.0' - Fracture, 60 deg, rough, undulating, tight			
			>10	165.0, 165.05' - Fractures (2), 15 deg and 5 deg, smooth, undulating, open			
			>10	165.3' - Fracture, 80 deg, rough, planar, open			
			4	165.5' - Fracture, 35 deg, rough, undulating, open			
175	R28-NQ 5 ft 100%	30	4	165.5-166.0' - Fracture zone, limestone fragments, gravel to cobble-sized			
-132.5			3	167.0-168.8' - Fracture zone, limestone fragments, gravel to cobble-sized			
			3	169.2' - Fracture, 5 deg, smooth, planar, tight 169.4' - Fracture, 30 deg, rough, undulating, tight			
			>10	170.2, 170.4' - Fractures (2), 10 deg, smooth, undulating, tight			
			>10	172.25' - Fracture, 40 deg, rough, planar, tight			
			>10	172.3, 172.8' - Fractures (2), 5 deg, rough, undulating, tight			
			3	172.55' - Fracture, 15 deg, rough, stepped, open			
180	R29-NQ 5 ft 100%	0	3	172.75' - Fractures, 10 deg, rough, undulating, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15	SHEET 10 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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-137.5			1	172.95' - Fracture, 40 deg, rough, stepped, tight	Limestone 169.0-169.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, strong (R4), few voids or cavities 169.4-172.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 20% of surface (up to 50% from 169.4-170.0'), laminated bedding below 171.0' at an angle of 5-10 degrees 172.0-177.0' - Same as 169.4-172.0' except more voids (up to 50% coverage) from 173.5-174.5' and presence of cavities (up to 3/16"x3/4") below 175.0', laminated bedding 174.8-175.3' 177.0-178.0' - Same as 172.0-177.0' 178.0-178.6' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), voids (<1/16") over 40% of surface 178.6-182.0' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), voids (1/16") over 50% of surface area below 180.0', breccia and dark stained laminated bedding below 180.5', some larger (3/16"x3/4") cavities below 180.5' 182.0-186.5' - light olive gray with laminations (uneven and irregular) of yellowish gray, (5Y 5/2 with 5Y 7/2), moderate HCl reaction, strong (R4), few areas of voids, few fossil molds, apparent breccia zones at 182.8-184.0' and 186.0-186.3', color of core mainly yellowish gray below 186.0' No Recovery 186.5-187.0' Limestone 187.0-189.0' - mottled yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild to moderate HCl reaction, strong (R4), mottling resolves into laminated bedding by 188.0', few voids or fossil molds 189.0-192.0' - dusky yellow with thin beds (1/2" thick) of pale olive, (5Y 6/2 with 10Y 6/2), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (<1/16") over 70% of the dusky yellow areas, larger voids (up to 3/8") also present, pale olive areas have few voids, fewer voids overall below 191.0', possible breccia from 189.4-190.0'	R30: 10 minutes	
182.0		0	173.2' - Fracture, 40 deg, rough, planar, tight 173.4' - Fracture, 50 deg, rough, undulating, open				
	R30-NQ 5 ft 90%	27	>10	173.45, 174.5' - Fractures (2), 5 deg and 20 deg, smooth, undulating, open 173.6, 173.75' - Fractures (2), 10 deg, smooth, undulating, tight 174.5-175.0' - Fracture zone, limestone fragments, gravel to cobble-sized 175.2' - Fracture, 10 deg, smooth, undulating, tight			
185			>10	175.25, 175.4' - Fractures (2), 75 deg and 15 deg, rough, undulating, open			
-142.5			0	175.8' - Fracture, 80 deg, rough, planar, open to tight			SC-7 collected at 185.0-186.0'
			1	176.5' - Mechanical break 176.75' - Fracture, 30 deg, rough, planar, tight			
187.0		NR		177.0-182.0' - Fracture, no piece longer than 5", most fractures could be from drilling, others appear to be in place			
			1	179.1' - Fracture, 70 deg, rough, planar, open			
	R31-NQ 5 ft 100%	38	3	179.3, 179.5' - Fractures (2), 20 deg and 10 deg, rough, undulating, open			
190			3	180.2' - Fracture, 20 deg, rough, planar, open			Bioturbation zones appear to be becoming more linear features possibly bedding features
-147.5			3	182.0-185.0' - Fracture zone or mechanical break, no piece longer than 5", most fractures could be from drilling, others appear to be in place			
			1	182.3, 182.5' - Fractures (2), 70 deg and 25 deg, rough, undulating, open for 182.3', tight for 182.5'			
192.0			0	182.8' - Fracture, 30 deg, smooth, undulating, tight, dusky brown to dusky yellow infilling 100%			
			2	182.9' - Fracture, 15 deg, smooth, undulating, tight			
	R32-NQ 5 ft 70%	20	>10	186.35' - Fracture, 10 deg, smooth, planar, tight to open up to 1/16"			
195			>10	187.4' - Fracture, 20 deg, smooth, undulating, open			
-152.5			NR	187.4-188.15' - Fracture zone, limestone fragments, gravel to cobble-sized			
				188.25' - Fracture, 5 deg, smooth, undulating, open			
				188.35' - Fracture, 85 deg, smooth, planar, tight			
197.0			4	188.5' - Fracture, 5 deg, smooth, undulating, tight			
			>10	189.0, 189.2' - Fractures (2), 25 deg and 40 deg, rough, undulating, open for 189.0', tight for 189.2'			
	R33-NQ 5 ft 48%	0	0	189.4' - Fracture, 20 deg, smooth, undulating, open			
200				189.4-190.0' - Fracture zone, limestone fragments, gravel to cobble-sized			
				190.35, 190.8' - Fractures (2), 25 deg, rough, undulating, tight for 190.35', open for 190.8'			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-15	SHEET 11 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 : 4.41 ft bgs on 3/06/07 START : 2/11/2007 END : 2/20/2007 LOGGER : A. Teal, R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-157.5			NR		Limestone 192.0-195.0' - Same as 189.0-192.0' except with laminated bedding (uneven and irregular), cavities (up to 3/8"x3/8") and some fossil molds from 192.0-193.5' 195.0-195.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids (<1/16") over 5% of surface, fossil molds and larger voids <5% of surface, moderately fossiliferous No Recovery 195.5-197.0' Limestone 197.0-199.4' - Same as 195.0-195.5' except fossil molds and cavities (up to 3/16"x3/8") now cover 10% of core surface No Recovery 199.4-202.0' Bottom of Boring at 202.0 ft bgs on 2/20/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. Total Depth 202.0' below ground surface	
202.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16	SHEET 1 OF 10
SOIL BORING 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
 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 : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.7	0.0	1.0	SS-1	0-2-3 (5) Poorly Graded Sand With Organics (SP) 0.0-1.0' - black to light brownish gray, (N1 to 5YR 6/1), moist, loose, no HCl reaction, very fine to fine silica sand, trace nonplastic fines, 30-35% fine organics, trace roots		08:33 Water level at 2.5' below ground surface 3-7/8" tricone bit
	1.5					
5	5.0	0.3	SS-2	4-4-2 (6) Sandy Lean Clay With Silt (CL-ML) 5.0-5.3' - greenish gray, (5G 6/1), wet, stiff, low to medium plasticity, slow dilatancy, no HCl reaction, 30-35% very fine silica sand, trace roots		
37.7	6.5					
10	10.0	0.8	SS-3	11-15-6 (21) Silt And Limestone (ML) 10.0-10.8' - moderate yellow, (5Y 7/6), wet, very stiff, very fine grained, 10-15% sand, nonplastic, rapid dilatancy, strong HCl reaction, 50% limestone, light olive brown, fine to coarse gravel-sized, strong rock		
32.7	11.5					
15	15.0	1.0	SS-4	39-50/6 (89/12") Silt And Limestone (ML) 15.0-16.0' - Same as 10.0-10.8'		Set casing to 20'
27.7	16.0					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16	SHEET 2 OF 10
SOIL BORING 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
 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 : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)						
22.7	20.0	0.1	SS-5	6"-6"-6" (N) 50/3.5 (50/3.5")	Limestone Fragments 20.0-20.1' - dark yellowish orange, (10YR 6/6), weak rock (R2), voids to 1/16", limestone fragments to 1/8"-1/2" Begin Rock Coring at 21.0 ft bgs See the next sheet for the rock core log		21.0': End soil sampling switch to rock coring
25							
17.7							
30							
12.7							
35							
7.7							
40							



PROJECT NUMBER: 338884.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 on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
25 17.7	R1-NQ 5 ft 44%	>10	>10	21.0-21.7' - Fracture zone, limestone fragments from gravel to cobble-sized 21.7-22.7' - Fracture zone	[Symbolic Log]	Limestone 21.0-23.2' - grayish orange, (10YR 7/4), medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), highly fossiliferous (molds/casts), voids (<1/16") over 70-75% of surface No Recovery 23.2-26.0'	Fossils including echinoids, gastropods and brachiopods R1: 2 minutes
		>10	>10	22.9' - Fracture, 45 deg, rough, planar, open			
		0	0				
		NR	NR				
30 12.7	R2-NQ 5 ft 80%	>10	>10	26.0-26.9' - Fracture zone, limestone fragments from gravel to cobble-sized	[Symbolic Log]	Limestone 26.0-30.0' - Same as 21.0-23.2' except dusky yellow, (5Y 6/4) No Recovery 30.0-31.0'	R2: 2 minutes
		>10	>10	27.3-28.8' - Fracture zone, fragments up to 1-1/2"			
		4	4	29.4-29.7' - Fracture or mechanical break (4), horizontal and 15 deg, rough, undulating, open			
		NR	NR				
35 7.7	R3-NQ 5 ft 70%	>10	>10	31.0-32.5' - Fracture zone, limestone fragments from gravel to cobble-sized	[Symbolic Log]	Limestone 31.0-34.5' - moderate yellow and light olive gray, (5Y 7/6 and 5Y 5/2), light olive gray mottling from 32.6-33.4', fine grained, strong HCl reaction, weak to medium strong (R2 to R3), predominately weak rock, medium strong from 32.3-33.8', voids (<1/16") over 80% of surface, fossiliferous No Recovery 34.5-36.0'	11:06 Stopped drilling to remix mud Driller's Remark: Lost circulation at 34.0-35.0' R3: 5 minutes
		>10	>10	32.5' - Fracture, 40 deg, rough, stepped, open			
		2	2	33.75' - Fracture, 25 deg, rough, undulating, open			
		0	0				
40 2.7	R4-NQ 5 ft 84%	>10	>10	36.0-37.2' - Fracture zone, limestone fragments from gravel to cobble-sized	[Symbolic Log]	Limestone 36.0-40.2' - Same as 31.0-34.5' except light olive gray, (5Y 5/2), color transition from above run complete by 37.0', voids <1/16" and abundant larger cavities to 3/16" yielding a rough surface No Recovery 40.2-41.0'	R4: 4 minutes
		1	1	37.25' - Mechanical break 37.55' - 25 deg, smooth, undulating, very tight			
		>10	>10	38.3-38.75' - Fracture zone, limestone fragments from gravel to cobble-sized 38.9' - 75 deg, rough, planar, very tight			
		0	0				
41.0		>10	NR	40.0-40.7' - Fracture zone, limestone fragments from gravel to cobble-sized			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
45 -2.3	R5-NQ 5 ft 22%	0	>10		Limestone 41.0-42.1' - moderate olive brown, (5Y 4/4), fine grained, strong HCl reaction, extremely weak (R0), friable No Recovery 42.1-46.0'	R5: 2 minutes	
46.0							
50 -7.3	R6-NQ 5 ft 100%	70	>10		Limestone 46.0-51.0' - Same as 41.0-42.1' except very weak (R1), voids <1/16" and cavities to 3/16" yielding rough appearance, trace black organic material 49.0-50.5'	SC-1 collected 46.4-47.45'	
51.0							
55 -12.3	R7-NQ 5 ft 50%	18	1		47.45' - Fracture, 35 deg, smooth, undulating, open		
56.0					48.3, 48.5, 48.7, 49.0' - Mechanical break (4)	R6: 2 minutes	
55 -12.3	R7-NQ 5 ft 50%	18	0		51.0-51.9' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" over 35% of surface, cavities to 3/16" over <5% of surface, fossiliferous Silt (ML) 51.9-53.5' - light olive gray, (5Y 5/2), strong HCl reaction, carbonate material No Recovery 53.5-56.0'	R7: 2 minutes	
56.0							
60 -17.3	R8-NQ 5 ft 78%	10	0		Silt (ML) 56.0-58.7' - Same as 51.9-53.5'		
61.0							
60 -17.3	R8-NQ 5 ft 78%	10	3		Limestone 58.7-59.9' - moderate olive brown, (5Y 4/4), fine grained, moderate HCl reaction, weak (R2), voids <1/16" over 15% of surface, trace cavities to 9/16"x3/4" on surface No Recovery 59.9-61.0'	R8: 3 minutes	
61.0							
61.0			NR		59.1' - Fracture, 80 deg, rough, planar, open 59.25' - Fracture, 30 deg, rough, stepped, tight 59.4' - 35 deg, rough, undulating, tight		



PROJECT NUMBER: 338884.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
 WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
65 -22.3 66.0 70 -27.3 71.0 75 -32.3 76.0 80 -37.3 81.0	R9-NQ 5 ft 96%	43	NA			Silt (ML) 61.0-63.0' - Same as 51.9-53.5' except trace organics 61.0-61.3', carbonate material	SC-2 collected at 63.4-64.3' R9: 3 minutes R10: 3 minutes R11: 4 minutes R12: 2 minutes	
			1	63.0' - 60 deg, rough, planar, tight 63.4, 64.3' - Mechanical break (2)		Limestone 63.0-65.8' - moderate olive brown, (5Y 4/4), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over 15% of surface, trace cavities to 9/16"x3/4" on surface		
			0	64.4-65.2' - Mechanical break (>10)				
	R10-NQ 5 ft 88%	50	2	65.3' - Fracture, 15 deg, smooth, undulating, open				No Recovery 65.8-66.0' Limestone 66.0-70.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 25% of surface increasing from 68.8', extremely weak (R0) zone from 67.2-67.5', 3/4"x1-3/16" cavity at 70.2', very fossiliferous below 68.5', solution cavity at 68.5-69.0'
			NR	65.7' - Fracture, 40 deg, rough, undulating, open				
			1	66.4' - Fracture, 10 deg, rough, undulating, open				
			2	67' - Fracture, 10 deg, smooth, undulating, tight				
			3	67.8' - Fracture, 65 deg, rough, planar, tight 68.1, 68.3' - Fracture (2), 20 deg, rough, undulating, open				
	R11-NQ 5 ft 98%	67	3	69.5, 69.8' - 40 deg, rough, undulating, open				No Recovery 70.4-71.0' Limestone 71.0-73.3' - Same as 66.0-70.4' except moderate olive brown, (5Y 4/4) 73.3-74.4' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), fine grained, moderate to mild HCl reaction, weak (R2), laminated bedding, voids <1/16" over 10%-15% of surface, trace organics 74.4-75.9' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over <10% of surface, lower strength rock from 75.5-75.9' No Recovery 75.9-76.0' Limestone 76.0-77.2' - Same as 74.4-75.5' 77.2-79.0' - light olive brown, (5Y 5/6), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 40% of surface, cavities up to 3/4"x1-9/16" over 15% of surface, fossiliferous, trace organics No Recovery 79.0-81.0'
			1	70.1' - Fracture, 20 deg, rough, undulating, open				
NR								
2			71.25' - 10 deg, rough, undulating, open 71.5' - 85 deg, rough, planar, tight					
>10			72.0' - Mechanical break, strong to very strong (R4-R5) 72.25' - Fracture, 20 deg, rough, undulating, open					
5			73.2' - Fracture zone, limestone fragments from gravel to cobble-sized					
0			73.4, 73.5, 73.7' - Mechanical break 73.95' - 25 deg, smooth, undulating, tight 74.5' - Mechanical break, medium strong (R3)					
R12-NQ 5 ft 60%	47	>10	75' - 10 deg, smooth, undulating, tight 75.4-75.9' - Fracture zone, limestone fragments from gravel to cobble-sized					
		NR						
		0	76.75' - Mechanical break 77.0-77.35' - Fracture zone, limestone fragments from gravel to cobble-sized					
		>10						
			NR	78.75' - 10 deg, rough, undulating, tight 78.9-79.0' - Fracture zone, limestone fragments from gravel to cobble-sized				



PROJECT NUMBER: 338884.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

WATER LEVELS : 2.5 ft bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS						
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION									
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS									
85 -42.3	R13-NQ 5 ft 50%	27	>10	81.1' - 5 deg, smooth, undulating, 1/16" clay infilling, dark brown clay infilling	[Symbolic Log]	Limestone 81.0-83.5' - dusky yellow grading to yellowish gray, (5Y 6/4 grading to 5Y 7/2), fine grained, moderate to mild HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 25% of surface, cavities up to 3/16"x3/8" over <5% of surface No Recovery 83.5-86.0'	4/6/07 08:04 Water level at 5.4' below ground surface						
			>10	81.6-82.6' - Fracture zone, limestone fragments from gravel to cobble-sized									
			1	83.05' - 15 deg, smooth, undulating, open									
			NR										
			90 -47.3	R14-NQ 5 ft 90%				37	>10	86.0-86.95' - Fracture zone, limestone fragments from gravel to cobble-sized	[Symbolic Log]	Limestone 86.0-89.5' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1/16" over 35% of surface, cavities to 3/4"x3/4" and fossil molds on 15% of surface, very fossiliferous transitioning to moderately fossiliferous at 88.0' 89.5-90.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 5-10% of surface, trace cavities to 3/16", moderately fossiliferous (molds) No Recovery 90.5-91.0' Limestone 91.0-93.0' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 30% of surface, cavities to 3/8"x3/4" No Recovery 93.0-96.0'	R13: 5 minutes
									4	87.3' - 45 deg, rough, planar, tight			
									10	87.5' - 80 deg, rough, planar, open			
									>10	87.55' - 10 deg, rough, undulating			
									0	87.85' - 50 deg, rough, planar, tight			
									NR	88.2, 88.5' - 60 deg, rough, planar, tight			
95 -52.3	R15-NQ 5 ft 40%	0	>10	88.7' - 20 deg, rough, undulating	[Symbolic Log]		R14: 6 minutes						
			>10	89.1-89.4' - Fracture zone, limestone fragments from gravel to cobble-sized									
			>10	89.5' - 30 deg, smooth, undulating, open									
			NR	89.6' - rough, undulating, tight									
			NR	91.0-92.6' - Fracture zone, limestone fragments from gravel to cobble-sized									
			NR	92.8' - 25 deg, smooth, undulating, tight									
100 -57.3	R16-NQ 5 ft 100%	65	3	96.0-96.6, 96.7' - 30 deg, smooth, planar, very tight	[Symbolic Log]	Limestone 96.0-97.9' - Same as 91.0-93.0' except inclusion fragments (to 1-3/16") of yellowish gray 97.9-101.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" on 5% of surface, trace fossil molds to 3/16"	R15: 6 minutes						
			>10	97.2-97.25' - 45 deg, rough, planar, high angle fracture zone, very tight									
			>10	97.9-98.6' - Fracture zone, limestone fragments from gravel to cobble-sized									
			4	98.8' - 60 deg, rough, planar, tight									
			1	98.95' - 25 deg, rough, undulating, open									
			1	99.05, 99.3' - 5 deg, rough, undulating, tight									
101.0	99.2' - 15 deg, rough, undulating, tight												
1	99.9' - 10 deg, rough, undulating, tight												
1	100.2' - 60 deg, smooth, planar, tight												



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.3	R17-NQ 5 ft 94%	62	>10 2 NA 0 1	102.0-102.2' - Fracture zone, limestone fragments from gravel to cobble-sized 102.65' - 10 deg, rough, undulating, open 102.9' - 60 deg, rough, planar, open 105.4' - 60 deg, rough, planar, tight	Limestone 101.0-103.1' - Same as 97.9-101.0' Silt (ML) 103.1-104.2' - moderate olive brown, (5Y 4/4), soft, strong HCl reaction, trace organics Limestone 104.2-105.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 30% of surface, trace fossil molds No Recovery 105.7-106.0' Limestone 106.0-110.0' - Same as 104.2-105.7' except color grades to mottled dusky yellow and light olive gray (5Y 6/4 and 5Y 6/1) by 107.0' then transitions to only dusky yellow by 109.0' No Recovery 110.0-111.0'	SC-3 collected at 101.0-102.0'	
110 -67.3	R18-NQ 5 ft 80%	58	6 9 3 6 NR	106.0-106.2' - Fracture zone, limestone fragments from gravel to cobble-sized 106.6' - 30 deg, rough, undulating, open 107.1-107.8' - 85 deg and vertical, planar, high angle fracture zone, multiple planar features open to moderately tight 108.5-110.0' - vertical, rough, planar, 15-20% charcoal gray to black, same as 107.1-107.8'		R17: 6 minutes	
115 -72.3	R19-NQ 5 ft 82%	33	>10 3 10 7 NR	111.0-111.2' - Fracture zone, limestone fragments from gravel to cobble-sized 112.35' - 60 deg, smooth, planar, tight 112.9' - 10 deg, rough, undulating, tight 114.55-114.7' - Fracture zone, limestone fragments from gravel to cobble-sized 114.9' - 20 deg, smooth, undulating, open		R18: 5 minutes	
120 -77.3	R20-NQ 5 ft 86%	52	>10 2 1 1 1 NR	116.0-116.3' - Fracture zone, rough, undulating, fragments 1/2"-1-1/2" 116.5, 117.0' - 20 deg, rough, undulating, open 117.35' - 10 deg, rough, undulating, tight 118' - horizontal, smooth, undulating, open 118.25' - horizontal, smooth, undulating, 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, undulating, black, open to 1/16"		Driller's Remark: Boring "cave-in" 15.0' from bottom (111.0') Advance HW casing from 70.0-110.0' SC-4 collected at 113.8-114.5' R19: 4 minutes R20: 6 minutes	
					No Recovery 115.1-116.0'		
					No Recovery 120.3-121.0'		



PROJECT NUMBER: 338884.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 : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -82.3	R21-NQ 5 ft 35%	20	3	121.1' - 5 deg, smooth, undulating, open 121.5' - 20 deg, rough, undulating, open 121.65' - 20 deg, rough, undulating, open 122.3-122.5' - Fracture zone, limestone fragments from gravel to cobble-sized	Limestone 121.0-122.3' - Same as 111.0-115.1' except yellowish gray and pale olive mottling, (5Y 7/2 and 10Y 6/2) 122.3-122.75' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, very weak (R1), voids <1/16" on 25% of surface, cavities and fossil molds to 3/8" on 5% of surface No Recovery 122.75-126.0'	R21: 6 minutes	
126.0			>10				
130 -87.3	R22-NQ 5 ft 84%	33	1	126.2-127.35' - Fracture zone, horizontal and 60 deg, 1/2"-2"	Limestone 126.0-126.2' - Same as 122.3-122.8' 126.2-130.2' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 10% of surface, trace cavities to 3/16" and fossil molds, zone of light olive gray which has neither voids nor fossils from 127.7 -128.1' No Recovery 130.2-131.0'	SC-5 collected at 128.1-128.9'	
131.0			3	127.65-128.1' - Fracture zone, vertical, rough, undulating, black, open to 1/16", 127.65' 45 deg 128.2, 128.9' - horizontal, rough, undulating, open			R22: 8 minutes
135 -92.3	R23-NQ 5 ft 58%	50	4	129.05' - 10 deg, smooth, undulating, open 129.35' - 50 deg, smooth, planar, open 129.6-130.0' - Fracture zone, fragments up to 1/16"-2"			
136.0			4	129.65' 45 deg			
140 -97.3	R24-NQ 5 ft 75%	38	3	131.7' - 70 deg, rough, planar, tight 131.7-132.4' - Fracture zone, 70 deg and vertical, rough, planar, tight to open	Limestone 131.0-133.9' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" on 25%, cavities to 3/16" and fossil molds on <5% of surface, moderately fossiliferous No Recovery 133.9-136.0'	R23: 5 minutes	
141.0			NR	133.8' - 10 deg, smooth, undulating, open			
			>10	136.0-136.5' - Fracture zone, rough, undulating, fragments 1/16"-2"		Limestone 136.0-139.75' - grayish yellow with pale olive from 138.8-139.5', (5Y 8/4 with 10Y 6/2), fine grained, strong HCl reaction, weak (R2), voids <1/16" on 35% of surface, fossil molds to 3/16"x3/8" from 138.4-139.8', moderately fossiliferous No Recovery 139.75-141.0'	SC-6 collected at 136.5-137.4'
			5	137.75-138.4' - Fractures or mechanical break, 5 deg, smooth, planar, tight			
			3	138.75' - 10 deg, rough, undulating, open			
			NR	139.5' - 15 deg, rough, undulating, open 139.75' - 25 deg, smooth, undulating, open		R24: 5 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-16	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.3	R25-NQ 5 ft 56%	0	10 >10 6 NR	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 HCl 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 HCl 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 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 fossil (molds) to 9/16"	R25: 5 minutes
146.0				146.0-147.3' - Fracture zone, dark, limestone fragments from gravel to cobble-sized	|	No Recovery 143.8-146.0'	
150 -107.3	R26-NQ 5 ft 30%	0	>10 >10 NR		|	Limestone 146.0-147.5' - yellowish gray, (5Y 7/2 and 5Y 5/2), light olive gray mottling, fine grained, mild HCl reaction, strong (R4), trace voids <1/16", cavities 1/16"x1/16" and fossil molds	Set casing to 150.0' due to cave-in on last run; stop coring at 151.0' for the day 4/7/07
151.0				151.0-151.5' - Fracture zone, subangular fragments predominately 1"-1/2"	|	No Recovery 147.5-151.0'	R26: 10 minutes
155 -112.3	R27-NQ 5 ft 90%	48	>10 5 >10 >10 4 NR	152' - 25 deg, smooth, undulating, open 152.3' - Mechanical break 152.45-153.2' - Fracture zone, rough, undulating, dark, staining on vertical fracture 153.7-154.2' - Fracture zone, fragments 1/16"-1/2" 154.4, 154.7, 155.05' - 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), laminar bedding below 153.5'	Water level at 5.3' below ground surface
156.0				155.25' - 15 deg, smooth, planar, open, solution cavity 155.3' - 10 deg, smooth, planar, tight 155.4' - 15 deg, smooth, planar, tight 156.0-156.4' - Fracture zone, rough, undulating, small fragments 1/16"- 1-1/2"	|	No Recovery 155.5-156.0'	R27: 10 minutes
160 -117.3	R28-NQ 5 ft 60%	47	>10 1 >10 NR	157.65' - Mechanical break 157.9' - 20 deg, smooth, undulating, open 158.7-158.9' - Fracture zone	|	Limestone 156.0-159.0' - yellowish gray transitions to dusky yellow below 158.0', (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, medium strong (R3), laminated bedding, 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'	R28: 9 minutes
161.0					|	No Recovery 159.0-161.0'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 4/5/07 START : 4/5/2007 END : 4/8/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
165 -122.3	R29-NQ 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 164.9,164.95, 165.05' - 10 deg, smooth, planar, tight 166.35, 167.7' - 40 deg, rough, planar, tight	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 HCl 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 HCl reaction, medium strong (R3), laminar bedding from 164.2-164.6', trace voids <1/16"	R29: 4 minutes	
170 -127.3	R30-NQ 5 ft 90%	77	1 2 >10 2 1 NR	167.8' - 55 deg, rough, planar, tight 167.95' - Mechanical break 168.75-169.2' - Fracture zone, dark, staining on vertical fractures 169.7' - Mechanical break 169.9' - 30 deg, smooth, undulating, tight 170.4' - horizontal, smooth, planar, open			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'
175 -132.3	R31-NQ 5 ft 100%	73	2 5 >10 0 4	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 175.1, 175.2, 175.35' - 10 deg, smooth, undulating, open, brownish staining at 175.2'	Limestone 171.0-171.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl 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 HCl 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 HCl reaction, medium strong (R3), laminated bedding 175.0-176.0', voids <1/16" on <5% of surface	R30: 6 minutes	
176.0				Bottom of Boring at 176.0 ft bgs on 4/8/2007			SC-8 collected at 173.9-175.0'
						R31: 6 minutes 15:07 End boring at 176.0', met recovery and RQD requirements	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-17	SHEET 1 OF 14
SOIL BORING 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
 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 : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.3	0.0	1.2	SS-1	1-3-6 (9)	Poorly Graded Sand With Organics (SP) 0.0-1.2' - brownish black to pale brown, (5YR 2/1 to 5YR 5/2), moist, loose, very fine to fine grained, no HCl reaction, up to 30% fine organics and roots, silica sand		4/9/07, 17:20 no water encountered 04/10/07 08:01: Begin drilling for the day Water level: 2.5' below ground surface, 08:01 on 4/10/07
	1.5						
5	5.0	1.2	SS-2	1-1-1 (2)	Silty Sand (SM) 5.0-5.9' - moderate yellowish brown, (10YR 5/4), wet, very loose, very fine to fine grained, no HCl reaction, 13% low plastic fines, silica sand Lean Clay With Sand (CL) 5.9-6.2' - greenish gray to dark yellowish orange to pale purple, (5G 6/1 to 10YR 6/6 to 5P 6/2), wet, very soft, medium to high plasticity, no dilatancy, no HCl reaction, 20-25% very fine to fine grained silica sand		
37.3	6.5						
10	10.0	1.0	SS-3	5-10-5 (15)	Silty Limestone Fragments With Sand 10.0-11.5' - white to yellowish gray, (N9, 5Y 9/1), wet, medium dense, strong HCl reaction, fine to coarse gravel, 20% low plastic fines, grained predominantly fine to medium sand, all carbonate		Driller's Remark: Slight mud loss at 12.0' below ground surface
32.3	11.0						
15	15.0	1.3	SS-4	34-39-42 (81)	Silt (ML) 15.0-16.3' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 8% very fine to medium sand, trace organics, trace black minerals, all carbonate		08:39 set casing to 20.0'
27.3	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-17	SHEET 2 OF 14
SOIL BORING 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
 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 : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
22.3	20.0	0.3	SS-5	50/3	Sandy Silt (ML) 20.0-20.2' - grayish orange, (10YR 7/4), moist, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 25-30% fine to medium sand, two fine gravel-sized limestone fragments, all carbonate Begin Rock Coring at 20.3 ft bgs See the next sheet for the rock core log		
	20.2			(50/3")			
25							
17.3							
30							
12.3							
35							
7.3							
40							



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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
21.0	NQ-1 0.8 ft 75%	0	NA		Silt (ML) 20.3-20.85' - Same as 15.0-16.3' except strong HCl reaction No Recovery 20.85-21.0'		
25 17.3	R2-NQ 5 ft 62%	0	NR		Limestone 21.0-24.1' - grayish orange, (10YR 7/4), medium to fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids <1/16" on 90-95% of surface, trace rounded to subrounded white casts, at 22.55' sandy clay lens, greenish gray, 0.1' thick, 22.56-22.9' trace linear white bedding, moderately to very fossiliferous No Recovery 24.1-26.0'	Casing advanced to 25.0'	
26.0							
30 12.3	R3-NQ 5 ft 90%	0	>10		Limestone 26.0-29.4' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), voids <1/16" on 25% of surface, zones of silt 27.0-29.4', 6" thick		
31.0							
35 7.3	R4-NQ 5 ft 64%	18	>10		29.4-30.5' - Fracture zone, sand to cobble-sized limestone fragments 31.9-34.2' - Fracture zone, 0-65 deg, rough, undulating, lighter coloration (grayish orange) up to 1/8" wide along 65 deg fracture at 33.0-33.3'		
36.0							
40 2.3	R5-NQ 5 ft 56%	27	>10		36.0-38.0' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, medium strong (R3), few voids <1/16" No Recovery 30.5-31.0' Limestone 31.0-34.2' - grayish orange with olive gray mottling over 60-70% of surface, (10YR 7/4, 5Y 4/1), very fine to fine grained, mild HCl reaction, weak (R2), predominately olive gray by 34.0', grayish orange material becoming associated with casts/molds, moderately fossiliferous, voids vary from 10-15% up to 50% in matrix No Recovery 34.2-36.0'		
					Limestone 36.0-38.0' - olive gray, (5Y 4/1), fine grained, moderate HCl reaction, voids <1/16" on 20% of surface, very fossiliferous, few cavities to 3/16" (molds) 38.0-38.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, extremely weak (R0), friable, trace organics No Recovery 38.8-41.0'		



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
41.0	R6-NQ 5 ft 68%		>10	41.0-44.4' - Fracture zone, 20-30 deg, rough to smooth, undulating, fragments predominately 1/2" up to 2"	Limestone 41.0-42.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" on 50% of surface, moderately fossiliferous, trace organics 42.3-44.4' - Same as 41.0-43.0' except extremely weak (R0), 42.3-42.5' seam of sandy lean clay No Recovery 44.4-46.0'		
45 -2.7			>10				
46.0			>10				
			NR				
46.0	R7-NQ 5 ft 68%		5	46.0-47.7' - Fractures (8), 20 deg, rough, undulating, to smooth and undulating, face angles parallel, open to 1/16"	Limestone 46.0-48.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, extremely weak (R0), friable, trace organics 48.2-48.6' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" on 40-50% of surface, laminations of organic material <1/16" 48.6-49.4' - Same as 46.0-48.2' No Recovery 49.4-51.0'		
50 -7.7			4	47.9' - Fracture, horizontal, smooth, undulating, open to 3/16"			
			>10	48.2, 48.4, 48.6' - Fracture (3), 0-20 deg, rough, undulating			
			>10	48.6-49.4' - Fracture zone, rough, undulating, rock fragments to 1"			
51.0	R8-NQ 5 ft 90%		NR		Limestone 51.0-52.5' - Same as 46.0-48.2' except laminations of organic material <1/16" from 51.0'-51.5' 52.5-55.5' - Same as 48.2-48.6' except few voids <1/16", organics more abundant No Recovery 55.5-56.0'		
55 -12.7			>10	51.3' - Fracture, 20 deg, smooth, undulating, open to 3/16"			
			4	51.4-52.0' - Fracture zone, 0-90 deg, rough, undulating, to smooth and undulating, fragments <3/16"-1-1/2"			
			1	52.1, 53.4, 53.6, 54.0, 54.9' - Mechanical break (5)			
			2	52.2, 52.3, 52.5, 52.8' - Fracture (4), 20 deg, rough, undulating, to smooth and planar, fractures non-parallel, open to 1/8"			
56.0	R9-NQ 5 ft 84%		1	53.1' - Fracture, 40 deg, smooth, undulating, open to 1/16"	No Recovery 55.5-56.0' Limestone 56.0-57.5' - Same as 52.5-55.5' 57.5-60.2' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, strong (R4), laminated bedding, voids <1/16" on 0-30% of surface, voids concentrated in zone from 58.4'-59.4', cavities to 3/4"x3/8" (fossil molds), trace organics, some laminated bedding inclined 10 deg		
			NR	54.3, 54.5' - Fractures or mechanical break (2), 10-20 deg, smooth, undulating, open to 3/16"			
			3	55.4' - Fracture, 20 deg, rough, planar, open to 1/16"			
			>10	56.1' - Fracture, horizontal, smooth, undulating, open to 1/16"			
			2	56.3, 56.5' - Fractures (2), 20-40 deg, smooth, undulating, open to 3/16"			
60 -17.7			>10	57.2' - Fracture, 0-20 deg, 20 deg on upper surface, 0 deg on lower surface, open			
			>10	57.5-58.1' - Fracture zone, 0-65 deg, smooth, undulating, trace silt and/or clay sized infilling, black staining on 65 deg fracture faces, fragments from 1/2"-2"			



PROJECT NUMBER:
338884.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 ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
61.0	R10-NQ 5 ft 58%		NR	58.75' - Fracture, 25 deg, rough, planar, tight 58.9-59.0' - Fracture, horizontal, 2 fragments, open		No Recovery 60.2-61.0' Limestone 61.0-62.7' - Same as 57.5-60.2' except intervals of laminated bedding, voids <1/16" and cavities up to 3/8" diameter from 61.5-62.7 62.7-63.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 25% of surface, very fossiliferous, molds up to 3/8" diameter No Recovery 63.9-66.0'		
		2	59.2-59.5' - Fracture zone, 70 deg, black staining on face, closed					
		8	59.7' - Fracture, 35 deg, closed 59.8-60.2' - Fracture zone, 0-65 deg, rough, undulating, dark staining					
		>10	61.1-61.3' - Fracture, 80 deg, dark staining, tight 61.5' - Fracture, 45 deg, smooth, planar, tight 62.05' - Fracture, 10 deg, smooth, undulating, tight					
65 -22.7			NR	62.3' - Fracture, 30 deg, fracture not completely through core 62.65' - Fracture, 15 deg, smooth, undulating, tight				
66.0			>10	62.8-63.0' - Fracture zone, smooth to rough, undulating, fragments 3/8"-1"				
			>10	63.3' - Fracture, 10 deg, smooth, undulating, loose 63.3-63.9' - Fracture zone, 0-90 deg, rough, undulating, dark staining, fragments <1/16"-2-1/2", staining on one 45 deg face				
			>10	66.0-66.4' - Fracture zone, smooth, undulating, some dark staining, fragments to 3/8"				
70 -27.7			>10	67.6-68.9' - Fracture zone, 0-90 deg, rough, undulating, fragments <1/16"-2", some organic material on some fragment faces 69.15' - Fracture, 75 deg, rough, planar, tight 69.4-70.4' - Fracture zone, similar to 67.6-68.9'				
71.0		R11-NQ 5 ft 100%		>10				Limestone 66.0-69.5' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 15% surface, cavities to 3/8" over <5%, moderately fossiliferous, trace organics 69.5-71.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak (R2), laminated bedding, inclined 30 deg, organics present along bedding, moderately fossiliferous at 70.5-71.0' 71.0-76.0' - Same as 69.5-71.0' except voids <1/16" on 5% of surface, laminated bedding with 30-45 deg angles, more pronounced	SC-1 collected at 66.4-67.6'
			1	71.9' - Fracture, horizontal, smooth, undulating, tight				
			1	72.35' - Fracture, 50 deg, smooth, planar, loose				
			0	72.8' - Mechanical break 73.1, 73.6, 75.5' - Mechanical break (3)				
75 -32.7			0					
			0					
76.0	R12-NQ 5 ft 100%		0	76.6' - Mechanical break				
			3	77.0' - Fracture, 55 deg, smooth, planar, tight				
			3	77.65' - Fracture, 20 deg, rough, undulating, loose				
			3	77.9' - Fracture, 30 deg, smooth, undulating, tight				
			NR	78.3' - Fracture, 25 deg, smooth, undulating, tight 78.4' - Fracture, horizontal, smooth, undulating, loose				
80 -37.7	R13-NQ 5 ft 52%		NR			No Recovery 78.6-81.0' 76.0-78.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (R1), thinly laminated (1/4"), inclined 5-10 deg, voids <1/16" on 15% of surface and trace organics predominately along bedding, trace 1/16"-1/8" gray clasts No Recovery 78.6-81.0'	Casing advanced to 80.0' end of day 4/10/07 at 101.0'	
			3	77.9' - Fracture, 30 deg, smooth, undulating, tight				
			NR	78.3' - Fracture, 25 deg, smooth, undulating, tight 78.4' - Fracture, horizontal, smooth, undulating, loose				



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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
81.0	R14-NQ 5 ft 55%			78.5' - Fracture, 45 deg, smooth, undulating, loose	Limestone 81.0-81.5' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 25% of surface 81.5-83.75' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 25% of surface, cavities to 3/8"x3/8" over 10% from 81.9-82.8', moderately fossiliferous No Recovery 83.75-86.0'		
		>10		81.5-81.9' - Fracture zone, rough, undulating, fragments <3/16"-1-1/2"			
		>10		82.2' - Mechanical break			
		>10		82.5-82.8' - Fracture zone, same as 81.5-81.9'			
		NR		82.8' - Fracture, 60 deg, rough, planar, loose 83.1' - Fracture, 40 deg, rough, undulating, tight 83.35-83.75' - Fracture zone, same as 81.5-81.9'			
85 -42.7							
86.0	R15-NQ 5 ft 98%		3	86.75' - Fracture, 45 deg, rough, planar, tight	Limestone 86.0-90.9' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong (R3), voids <1/16" on 25-30% of surface, trace cavities to 3/16" except 5% at 89.4-90.9', very fossiliferous from 89.4-90.9'	SC-3 collected at 88.2-89.35'	
			10	86.95-87.3' - Fracture zone, 0-60 deg, smooth, undulating, fragments 3/8"-1-1/2"			
			2	87.75, 88.2' - Fractures (2), 20-30 deg, smooth, undulating, tight			
			0	89.35' - Fracture, 20 deg, rough, undulating, loose, clay seam 1/32" thick			
			NR	90.5' - Fracture, 30 deg, smooth, undulating, tight, clay seam 1/4" thick			
90 -47.7							
91.0	R16-NQ 5 ft 64%		>10	90.6' - Fracture, 15 deg, smooth, undulating, loose	No Recovery 90.9-91.0' Limestone 91.0-91.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to strong (R3 to R4) 91.5-94.2' - moderate yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, laminated organics 1/16" thick at 91.7' and 92.4' with trace laminated organics elsewhere, voids <1/16" on 25% of surface, few larger cavities along apparent healed fracture planes No Recovery 94.2-96.0'		
			1	91.0-91.7' - Fracture zone, 0-90 deg, fragments <3/8"-1-1/2", clay films			
			>10	92.5' - Mechanical break			
			>10	92.9' - Fracture, 60 deg, rough, planar, open to 1/16"			
			NR	93.15' - Fracture, 80 deg, rough, planar, tight 93.25' - Fracture, 75 deg, smooth, planar, tight 93.5-94.2' - Fracture zone, 0-70 deg, smooth, undulating, fragments 3/8"-2-1/2"			
95 -52.7							
96.0	R17-NQ 5 ft 40%		>10	96.0-98.0' - Fracture zone, smooth to rough, undulating, fragments 3/8"-3"	Limestone 96.0-98.0' - grayish orange and light gray, (10YR 7/4 and N6), fine grained, mild to moderate HCl reaction, strong (R4), few voids <1/16" over 20% from 97.0-97.5' No Recovery 98.0-101.0'		
			>10				
			NR				
100 -57.7						Casing advanced to 100.0'	



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
101.0	R18-NQ 5 ft 100%	82	>10	101.0-101.35' - Fracture zone, to 90 deg, fragments 3/8"-2-1/2"	Limestone 101.0-106.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 15% of surface, trace cavities to 3/8" predominately fossil molds and casts, very fossiliferous 106.0-111.0' - Same as 101.0-106.0' except olive gray mottling (5Y 4/1), at 107.0' laminated bedding from 109.6-110.2' inclined 40 deg 111.0-116.0' - Same as 101.0-106' except trace organics from 113.6-114.3', cavities to 3/8"x1-3/16" from 113.6-114.3' 116.0-119.5' - Same as 101.0-106.0'	Water level at 1.9' below ground surface SC-4 collected at 102.15-103.5' SC-5 collected at 107.25-108.5' SC-6 collected at 111.0-112.1'	
102.15'			1	102.15' - Fracture, 60 deg, rough, planar to undulating, tight			
103.5'			1	103.5' - Fracture, 50 deg, smooth, undulating to planar, tight			
104.0, 105.4'			1	104.0, 105.4' - Fractures (2), 15 deg, rough, undulating, tight			
105.6'			2	105.6' - Fracture, 70 deg, smooth, planar, tight			
106.0	R19-NQ 5 ft 100%	77	3	106.1-106.4' - Fracture, 60 deg, rough, undulating, tight to open to 1/16"			
106.4-106.7'			2	106.4-106.7' - Fracture, apparent healed fractures			
106.5'			1	106.5' - Fracture, 40 deg, rough, undulating, tight			
106.8'			>10	106.8' - Fracture, horizontal, rough, undulating, tight			
107.0, 107.25, 108.5'			3	107.0, 107.25, 108.5' - Fractures (3), 60 deg, smooth, planar, tight			
109.0-109.3'	R20-NQ 5 ft 100%	100	3	109.0-109.3' - Fracture zone, 0-80 deg, rough, undulating, fragments 3/16"-2"			
109.8'			1	109.8' - Fracture, 60 deg, rough, undulating, open to 1/16", organic material on faces			
110.15'			0	110.15' - Fracture, 45 deg, smooth, undulating			
110.25'			1	110.25' - Fracture, 50 deg, rough, undulating, open to 1/16"			
110.65'			0	110.65' - Fracture, 60 deg, rough, undulating, open to 1/8"			
112.1'	0	112.1' - Fracture, 75 deg, rough, undulating, tight					
113.6, 114.45'	0	113.6, 114.45' - Mechanical break (2)					
116.0	R21-NQ 5 ft 70%	50	0	116.0-119.5' - Same as 101.0-106.0'			
117.6'			1	117.6' - Fracture, 25 deg, smooth, undulating, charcoal gray staining on 30%, tight			
118.0-118.2'			7	118.0-118.2' - Fracture zone, 0-50 deg, rough, planar, open to 1/16"			
118.2'			>10	118.2' - Fracture, 50 deg, rough, planar, tight			
118.65'				118.65' - Fracture, 30 deg, smooth, undulating, tight			
119.5-121.0'			No Recovery 119.5-121.0'				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -82.7	R22-NQ 5 ft 22%	12	NR	118.9' - Fracture, 10 deg, smooth, undulating, 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, rough, undulating, fragments <3/16"-2" 121.3-121.9' - Fracture, vertical, rough, undulating, dark gray staining, open to 1/16"	□	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'	
130 -87.7	R23-NQ 5 ft 86%	18	>10 >10 4 2 2 NR	126.0-126.6' - Fracture, 80 deg, rough, undulating, open to 1/16" 126.3' - Fracture, 45 deg, rough, undulating, tight 126.6-128.0' - Fracture zone, 0-75 deg, smooth, planar, to rough and undulating, fragments 3/8"-3" 128.3' - Fracture, 35 deg, rough, undulating, tight 128.4' - Fracture, 35 deg, rough, undulating, tight, intersects fracture at 128.3' 128.5' - Fracture, 15 deg, smooth, undulating, open 128.5-128.9' - Fracture, 60-70 deg, smooth, undulating, tight 129.25' - Fracture, 60 deg, rough, undulating, tight 129.4' - Fracture, 20 deg, rough, undulating, tight to open to 3/8" 130.0, 130.1' - Fractures (2), 30 deg, smooth, undulating, open, intersecting 130.1' 131.3-131.6' - Fracture zone, up to 70 deg, rough, undulating, to smooth and undulating, fragments 3/8"-1" 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, tight	□	Limestone 126.0-128.0' - moderate yellowish brown with light olive gray laminations 1/4" thick, (10YR 5/4 with 5Y 4/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" over 20% of surface trace cavities to 3/16", moderately fossiliferous, trace organics 128.0-130.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), voids over 20% of surface, few cavities to 3/16" predominately fossil casts/molds, moderately fossiliferous No Recovery 130.3-131.0' Limestone 131.0-133.5' - Same as 128.0-33.5' except less cavities to 3/16" diameter	
135 -92.7	R24-NQ 5 ft 50%	25	>10 >10 0 NR	129.4' - Fracture, 20 deg, rough, undulating, tight to open to 3/8" 130.0, 130.1' - Fractures (2), 30 deg, smooth, undulating, open, intersecting 130.1' 131.3-131.6' - Fracture zone, up to 70 deg, rough, undulating, to smooth and undulating, fragments 3/8"-1" 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, tight	□	No Recovery 133.5-136.0'	
140 -97.7	R25-NQ 5 ft 60%	38	>10 2 0 NR	136.0-136.8' - Fracture, 60 deg, smooth, planar, loose 137.5' - Fracture, 75 deg, smooth, planar, loose 137.65' - Fracture, 60 deg, smooth, planar, charcoal gray to black staining on 90-95% of surface, loose	□	Limestone 136.0-139.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" on 20% of surface, moderately fossiliferous, trace molds to 3/8"x3/16", possible healed fractures at 136.4' and 136.7' No Recovery 139.0-141.0'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
141.0								
	R26-NQ 5 ft 72%	38	1	141.25-142.7' - Fracture zone, up to 75 deg, rough to smooth, undulating, dark staining, fragments <3/8"-3"		Limestone 141.0-144.6' - Same as 136.0-139.0' except mainly light olive gray, (5Y 5/2), very fossiliferous below 142.0', molds to 3/16"x3/8" on 5% of surface		
145 -102.7			0	143.25' - Fracture, 45 deg, rough, planar, tight				
			NR			No Recovery 144.6-146.0'		
146.0			1	146.7' - Fracture, horizontal, rough, undulating, open		Limestone 146.0-150.6' - Same as 136.0-139.0' except several healed fractures at 147.0-148.0', inclined 55 deg		
	R27-NQ 5 ft 92%	77	4	147.2' - Fracture, 55 deg, rough, undulating, tight				
150 -107.7			4	148.3-148.5' - Fractures (4), 30-70 deg, rough, undulating, 3 fragments to 1-1/2", tight to 1/16" open				
			1	149.45' - Fracture, 30 deg, rough, undulating, tight				
			NR	149.75, 149.8, 149.9' - Fractures (3), 20 deg, rough, undulating, loose		No Recovery 150.6-151.0'		
151.0			1	150.6' - Fracture, 70 deg, rough, planar, tight		Limestone 151.0-155.0' - Same as 136.0-139.0' except cavities from 3/16" diameter to 3/4"x1-3/16" on 15-20% of surface from 153.5-154.5' and 151.9-152.3', trace organics from 152.0-152.3'		
	R28-NQ 5 ft 80%	63	2	151.85' - Fracture, 75 deg, rough, planar, tight				
			1	152.2' - Fracture, 25 deg, rough, undulating, loose, organics on lower faces				
			>10	152.3' - Fracture, 25 deg, rough, undulating, tight to open to 3/8"				
155 -112.7			NR	153.2, 153.5' - Mechanical break (2)		No Recovery 155.0-156.0'		
				153.8' - Fracture, 15 deg, rough, undulating, loose				
				154.5-155.0' - Fracture zone, 0-75 deg, rough, undulating, fragments 3/8"-1"				
156.0			>10	156.0-156.5, 157.0-157.35' - Fracture zone (2), 0-60 deg, rough, undulating, brown staining on some fracture planes, fragments to 1-1/2"		Limestone 156.0-160.7' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16" except from 158.5-160.5' where voids present over 25% of surface, cavities to 9/16" diameter throughout core and associated with healed fractures		
	R29-NQ 5 ft 94%	60	3	158.8' - Fracture, 80 deg, rough, undulating, tight				
160 -117.7			>10	158.95-159.5' - Fracture zone, 20-80 deg, rough, undulating, fragments to 3"				

SC-7 collected at 148.5-149.45'



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
161.0			1		No Recovery 160.7-161.0' Limestone 161.0-162.4' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3), laminated bedding at 161.0-161.5', trace organics at 162.0', voids <1/16" on 15% of surface grouped along bedding, trace cavities to 3/4" diameter 162.4-165.2' - light olive gray with moderate yellowish brown, (5Y 5/2 with 10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), some cavities up to 1-9/16" oriented along healed fractures No Recovery 165.2-166.0' Limestone 166.0-170.8' - moderate yellowish brown and light olive gray, (10YR 5/4 and 5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), laminated bedding at 166.0-166.8' and 169.7-170.1' inclined 30-35 deg with voids <1/16" on 25% of surface, trace cavities to 3/16"x1-3/4"		
			NR				
			1				
			>10				
	R30-NQ 5 ft 84%	67	3				
			3				
165 -122.7			0				
			NR				
166.0			2				
			3				
	R32-NQ 5 ft 96%	57	8				
			1				
170 -127.7			2				
			NR				
171.0			0				
			3				
	R33-NQ 5 ft 94%	88	2				
			1				
175 -132.7			0				
			NR				
176.0			3				
			0				
	R34-NQ 5 ft 98%	43	10				
			10				
180 -137.7							



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
181.0			2		178.9-180.9' - pale olive, (10Y 6/2), very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), 15% voids due to fossil (casts/molds), cavities to 1" long by 1/4"x1/2"		
			NR				
			2		181.25' - Fracture, 7 deg, smooth, planar, minor iron oxide staining		
			>10		181.95' - Fracture, 45 deg, rough, angular, solution expanded		
			1		182.55' - Fracture zone, fragments to 1"x1-1/2"		
	R35-NQ 5 ft 84%	59	1		183.25' - Fracture, 45 deg, planar to slightly undulating, with some carbonate recrystallization	R35: 9 minutes SC-8 collected at 183.25-184.2'	
			1				
185 -142.7			0		184.8' - Fracture, rough, undulating, with carbonate recrystallization on fracture surface, break is at the base of a clast in breccia		
			NR				
			>10		186.0-187.0' - Fracture zone, moderate to heavy iron oxide, multiple fracture orientations		
			1		187.25' - Fracture or mechanical break, very angular surface		
	R36-NQ 5 ft 32%	0	NR			R36: 18 minutes	
190 -147.7							
			>10		191.0-192.0' - Fracture zone, multiple fractures, random orientations, fragments to 1"		
			NR				
	R37-NQ 5 ft 20%	0	NR			R37: 11 minutes	
195 -152.7							
			2		196.3' - Fracture, 20 deg, rough, undulating		
			3		196.95' - Fracture, 40 deg, rough, undulating, <5% recrystallization on surface		
			2		197.3' - Fracture, 30 deg, rough, minor recrystallization		
	R38-NQ 5 ft 86%	67	2		197.65-197.75' - Fracture zone, fragments <1", recrystallization on surfaces, fragments may be from cavity break down		
			1		198.5-198.8' - Fracture zone or bedding plane, 1-3 deg, smooth, planar, minor recrystallization, fragments <1"		
200 -157.7			0			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 ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
201.0	R39-NQ 5 ft 76%	NR		199.05' - Fracture, 1-5 deg, rough, undulating	Limestone 196.0-198.4' - dusky yellow with moderate brown and dusky brown, (5Y 6/4 with 5YR 6/4 and 5YR 2/2), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), infill along bedding or subsidence planes inclined 65-80 deg, organic material as discontinuous, lenticular to planar accumulations, 196.9-198.4' cavities to 1"x1/2" on 35% of surface, trace recrystallized infill of cavities, trace healed fractures 198.4-198.8' - pale brown, (5YR 5/2), very fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), laminated bedding, irregular discontinuous contact at high angle, and healed 198.8-200.3' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, medium strong (R3), highly fossiliferous (casts/molds), 20% voids related to fossil molds and casts No Recovery 200.3-201.0' Limestone 201.0-204.8' - yellowish gray to dusky yellowish, (5Y 8/1 to 5Y 6/4), very fine grained, weak to medium strong (R2 to R3), voids <1/16" on 15% of surface and cavities to 1/2" on 15% of surface, organics up to 10% of surface except 201.7-201.9' and 204.25-204.4' which have 50% and 30% laminar organics, fossiliferous No Recovery 204.8-206.0' Limestone 206.0-209.9' - light gray from 206.0-208.1' to dusky yellow below, (N7 to 5Y 6/4), very fine grained, medium strong (R3), trace voids to <1/16" except from 208.0-209.0' voids on 30-50% of surface, fossiliferous (casts/molds) No Recovery 209.9-211.0' Limestone 211.0-213.1' - dusky yellow with yellowish gray and light gray, (5Y 6/4 with 5Y 7/2 and N7), very fine grained, weak to medium strong (R2 to R3), voids <1/16" on up to 50% of surface, fossiliferous, with fragments that are poorly fossiliferous with <15% voids to <1/16" 213.1-213.5' - yellowish gray, (5Y 7/2), very fine grained, trace voids <1/16", poorly fossiliferous, organic laminations throughout	N. Jarzyniecki begins logging at 201.0' SC-9 collected at 203.5-204.4' 204.0-205.0' hard drilling Chatter throughout Chatter throughout R41	
205 -162.7		54	>10	201.1-201.2' - Fracture zone, intersecting fractures, open <1/4"			
		4		201.85' - Mechanical break, 10 deg			
		0		202.15, 202.65' - Fractures (2), rough, undulating, open to 1/2"			
		2		202.3, 204.65' - Bedding plane, 40 deg, rough, undulating, open to 1/2"			
206.0	R40-NQ 5 ft 78%	NR		202.95' - Bedding plane, 10 deg, smooth to rough, undulating, open to 1/4"			
				204.1' - Mechanical break			
				204.8' - Fracture, 70-80 deg, smooth, undulating, open, organic staining			
		37	>10	206-206.4, 209.05-209.9' - Fracture zone (2), organic staining, intersecting fractures, open <1/4"			
		1		206.6' - Bedding plane, 30 deg, smooth, undulating, tight			
210 -167.7	R41-NQ 5 ft 60%	NR		207.55' - Bedding plane, <5 deg, smooth, undulating			
				207.8' - Fracture, 40-45 deg, rough, stepped, open to 1/2"			
				208.8' - Fracture, 65 deg, rough, undulating, organic staining, open			
		45	>10	211.0-211.5' - Fracture zone, rough, undulating, some organic staining, open to 1/4"			
		3		212.6' - Mechanical break			
215 -172.7	R42-NQ 5 ft 98%	NR		213.4, 213.5' - Bedding plane (2), <10 deg, smooth, undulating, open to 1/4"			
				213.9' - Bedding plane, 10 deg, rough, undulating, organic staining, open to 1/4"			
				216.45, 218.6, 218.85, 219.35, 219.45, 219.6, 219.7, 220.75' - Bedding plane (7), 5-10 deg, rough, undulating, open to 1/4"			
				217.4' - Bedding plane, 25 deg, rough, undulating, open to 1/4"			
		73	1	218.9' - Bedding plane, rough to smooth, planar, organic staining, open to 1/4"			
220 -177.7							



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical

WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
221.0			1		213.5-214.0' - dusky yellow with pale olive, (5Y 6/4 with 10YR 6/2), weak to medium strong (R2 to R3), voids <1/16" on up to 50% of surface, fossiliferous	10:50 chatter at 223.0-224.0'	
			NR		No Recovery 214.0-216.0' Limestone		
			1		216.0-220.9' - Same as 211.0-213.1' except dusky yellow, (5Y 6/4), medium strong (R3), voids to 1/8" on up to 70% of surface, highly fossiliferous (casts) decreasing with depth, clasts 1/2"-3" diameter, laminated organics from		
	R43-NQ 5 ft 86%	48	1		219.0-219.65'		
			>10		No Recovery 220.9-221.0' Limestone		
225 -182.7			NR		221.0-222.35' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y 7/2), fine grained, voids <1/16" 15-50% of surface, very fossiliferous (casts/ molds)		
226.0			2		222.35-223.7' - dusky yellow, very pale orange and pale olive, (5Y 6/4, 10YR 8/2 and 10Y 6/2), trace voids <1/16", poorly fossiliferous		
			3		223.7-225.3' - Same as 216.0-220.9' except weak to medium strong (R2 to R3)		
	R44-NQ 5 ft 64%	48	>10		No Recovery 225.3-226.0' Limestone		
230 -187.7			NR		226.0-229.2' - Same as 216.0-220.9'		
231.0			>10		No Recovery 229.2-231.0' Limestone		
			>10		231.0-232.1' - Same as 216.0-220.9' except medium strong (R3), laminations from 231.8'-231.9'		
			>10		232.1-233.3' - pale olive, (10Y 6/2), fine grained, very weak to weak (R1 to R2), voids <1/16" on 50% of surface, very fossiliferous		
	R45-NQ 5 ft 46%	10	NR		No Recovery 233.3-236.0' Limestone		
235 -192.7			>10		236.0-237.9' - Same as 232.1-233.3' except pale olive to dusky yellow and light gray, (10Y 6/2 to 5Y 6/4, and N7), very weak to medium strong (R1 to R3), trace organics and voids <1/16", poorly fossiliferous, light gray laminations at 236.75-237.1' and 237.8-237.85'		
236.0			>10		No Recovery 237.9-241.0'		
	R46-NQ 5 ft 38%	0	NR				
240 -197.7							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/18/2007 LOGGER : A. Teal, N. Jarzyniecki, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
241.0	R47-NQ 5 ft 80%	53	>10	241.0-241.65, 244.4-244.75' - Fracture zone (2), open to 1/4", intersecting fractures	Limestone 241.0-241.65' - Same as 236.0-237.9' except no laminations 241.65-243.6' - Same as 216.0-220.9' 243.6-245.0' - pale olive, (10Y 6/2), very fine grained, weak (R2), poorly fossiliferous No Recovery 245.0-246.0'	14:38 end drilling Note: 4/19/07 grouted hole, used 59 bags quickcrete, 1 bag hole plug	
245 -202.7			1	241.9' 243.9' - Bedding plane or mechanical break (2), 10 deg, rough, undulating, tight			
			5	242.4' - Fracture, 60 deg, rough, undulating, tight			
			>10	243.1' - Bedding plane or mechanical break, 10 deg, rough, undulating, open to 1/4"			
			NR	243.4, 243.6' - Bedding plane (2), 10-15 deg, rough, undulating, open to 1/4"			
246.0	R48-NQ 5 ft 34%	13	>10	246.0-246.4, 246.5-246.7, 247.6-247.7' - Fracture zone (3), intersecting fractures, open to 1/8"	Limestone 246.0-247.7' - Same as 243.6-245.0' No Recovery 247.7-251.0'		
			10				
250 -207.7			NR				
251.0					Bottom of Boring at 251.0 ft bgs on 4/18/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 1 OF 11
SOIL BORING 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
 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 : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.3						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						
5	0.4	SS-1	2-2-1 (3)	Silty Sand (SM) 3.5-3.9' - grayish orange, (10YR 7/4), wet, very loose, no HCl reaction, fine silica sand, 25% nonplastic fines		
37.3	5.0					
8.5						
10	0.9	SS-2	2-2-3 (5)	Clayey Sand (SC) 8.5-9.4' - light bluish gray, (5B 7/1), wet, loose, no HCl reaction, fine silica sand, 40% medium plastic fines		
32.3	10.0					
13.5						
15	1.1	SS-3	3-3-5 (8)	Clayey Sand (SC) 13.5-14.1' - Same as 8.5-9.4' Poorly Graded Sand (SP) 14.1-14.6' - white to very light gray, (N9 to N8), wet, loose, no HCl reaction, fine silica sand, trace nonplastic fines, trace black minerals		
27.3	15.0					
18.5						
20	0.0	SS-4	0-0-0 (0)	No Recovery 18.5-20.0'		
20.0	20.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 2 OF 11
SOIL BORING 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
 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 : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.3						
23.5	1.5	SS-5	0-0-0 (0)	Fat Clay (CH) 23.5-24.2' - light to medium light gray, (N7 to N6), wet, very soft, high plasticity, no dilatancy, no HCl reaction Sandy Lean Clay (CL) 24.2-25.0' - very light to light gray, (N8 to N7), wet, very soft, medium plasticity, no to slow dilatancy, no HCl reaction, 41% fine silica sand		
25 17.3						
28.5	0.4	SS-6	50/5 (50/5")	Silt With Sand (ML) 28.5-28.9' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 20% fine to medium sand, trace organics in laminar lenses, all carbonate		Change from 3-1/2" drag bit to 3-3/8" tricorne roller bit at 30.0'
30 12.3						
33.5	1.5	SS-7	17-29-65 (94)	Sandy Silt (ML) 33.5-35.0' - Same as 28.5-29.0' except moderate yellowish brown, (10YR 5/4), moist, rapid dilatancy, 25-30% fine to medium sand, all carbonate		
35 7.3						
38.5 38.7	0.2	SS-8	50/2.5 (50/2.5")	Limestone Fragments 38.5-38.7' - moderate to strong HCl reaction, coarse sand to fine gravel, fine grained, <1/16" voids		Grinding at 38.0'
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 3 OF 11
SOIL BORING 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
 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 : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.3			6"-6"-6" (N)			Moderate grinding
43.5						Driller's Remark: Clay, softer
45 -2.7	0.6	SS-9	7-9-61 (70)	Silt With Sand (ML) 43.5-44.1' - medium dark gray, (N4), moist to wet, hard, nonplastic to low plasticity, rapid dilatancy, moderate HCl reaction, 25% fine to medium silica sand, trace organics, all carbonate, organics in SS-9 appear to be grass		Set HW casing to 30.0'
48.5						
50 -7.7	1.3	SS-10	14-38-43 (81)	Silt With Sand (ML) 48.5-49.0' - Same as 43.5-44.1' Sandy Silt (ML) 49.0-49.8' - dark yellowish brown, (10YR 4/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 43% fine to coarse sand, 3/8" thick clayey seams, all carbonate		
53.5						
55 -12.7	0.4	SS-11	50/5 (50/5")	Sandy Silt (ML) 53.5-53.85' - Same as 48.5-49.8' except trace organics		Trip out 3" casing
58.5						
60	0.2	SS-12	50/4 (50/4")			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 4 OF 11
SOIL BORING 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
 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 : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
-17.7			6"-6"-6" (N)	Silt With Sand (ML) 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		Circulation loss at 60.0'
63.5 63.8	0.3	SS-13	50/4 (50/4")	Silt With Sand (ML) 63.5-63.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 24% fine to medium sand, all carbonate		Driller's Remark: Hard drilling at 65.5'
65 -22.7						
68.5 68.8	0.2	SS-14	50/3 (50/3")	Silt (ML) 68.5-68.65' - Same as 63.5-63.8' except 10-15% coarse sand to fine gravel-sized limestone in lenticular shapes		
70 -27.7						
73.5 73.7	0.0	SS-15	50/2 (50/2")	No Recovery 73.5-73.7'		
75 -32.7						
78.5						
80 80.0	1.2	SS-16	53-50-39 (89)			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 5 OF 11
SOIL BORING 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
 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 : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-37.7				Silty Sand With Gravel (SM) 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			
83.5							
	1.3	SS-17	15-11-34 (45)	Silty Sand With Gravel (SM) 83.5-84.8' - Same as 78.5-79.7' except black organics in laminar beds from 84.6-84.8'			
85 -42.7							
	0.6	SS-18	22-52/4 (74/10")	Silty Sand With Gravel (SM) 88.5-89.1' - Same as 83.5-84.8'		HW casing set to 30.0', set NW casing to 55.0'	
88.5							
89.3							
				Begin Rock Coring at 88.5 ft bgs See the next sheet for the rock core log			
90 -47.7							
95 -52.7							
100							



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 ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION	
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	
88.5	R0-NQ 2.5 ft 60%	47	1	88.7' - Fracture, horizontal, rough, undulating	Limestone 88.5-90.0' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 80% coverage of 1/16" voids on surface, few larger 3/16" voids near lower end of run, moderately fossiliferous (casts), lignite disk 1/8" thick, silty matrix when grains broken down No Recovery 90.0-91.0' Limestone 91.0-96.0' - Same as 88.7-89.0' except more abundant cavities (up to 9/16") from 93.5-94.5', cavities appear to be fossil molds, some small (1/16"x1/8") fragments of dark organic material from 94.5-96.0'	Core run R0-NQ advanced 88.5-91.0' to set 5-foot stroke for remainder of borehole SC-1 collected at 89.1-89.8' R0: 4 minutes 2/25/08 08:00 Begin inserting NQ rods Driller's Remark: Loss of circulation between 94.0-96.0' R1: 14 minutes		
90-47.7			1	89.8' - Fracture, horizontal, rough, undulating, break is along plan of 1-3/16" clam shell fossil				
91.0	NR							
95-52.7	R1-NQ 5 ft 100%	75	1	91.7' - Fracture, 25 deg, rough, undulating, 3/16" open, semi-tight				
			1	92.8' - Fracture, horizontal, smooth, undulating, open				
			0	94.0' - Fractures, 30-50 deg, multiple fractures				
			>10	95.4' - Fractures (2), 45 deg, almost perpendicular, one is smooth and undulating with some dark staining, other is rough and undulating with no staining				
96.0	R2-NQ 5 ft 26%	0	>10	96.0-97.3' - Fractures, 0-90 deg, rough, undulating, slightly weathered, 3/16" relief, open			Limestone 96.0-97.3' - yellowish gray with pale olive (20%), (5Y 7/2 with 10 6/2), fine grained, moderate to strong HCl reaction, weak (R2), 50-60% coverage of 1/16" voids on surface, areas with voids mix irregularly with areas without voids, moderately fossiliferous, few voids >1/16" No Recovery 97.3-101.0'	R2: 7 minutes Driller's Remark: Low recovery possibly from losing inner core from broken pieces during drilling actions Drilling head appears loose during coring causing an eccentric advancement, breaking up rock R3: 11 minutes
100-57.7			>10	101.0-102.8' - Fractures, 0-45 deg, rough, undulating, up to 3/16" relief, open, one 2" fragment shows coring marks in two different directions (at 101.9'), fracture at 102.1' is moderately tight and 30% rough and undulating				
101.0	R3-NQ 5 ft 36%	17	>10					
105-62.7			NR					
106.0	R4-NQ		>10	106.3-107.0' - Fractures, 0-60 deg, rough, undulating, fragments range from 3/16" to 1-1/2", open				
			5	107.0-107.4' - Fracture, vertical, rough, undulating, tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -67.7	5 ft 100%	35	2	107.4, 107.7, 107.8, 107.10' - Fractures (4), 0-20 deg, rough, undulating, open	Limestone 106.0-111.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), 90% 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 of organic material below 110.0' 111.0-116.0' - Same as 106.0-111.0' except mild to moderate HCl reaction, moderately fossiliferous from 112.0-114.0', 1/16" voids-molds Limestone 116.0-118.0' - Same as 111.0-116.0' 118.0-121.0' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, weak (R2), fine grain, 50-60% coverage of 1/16" voids on surface, few larger voids <1/16", voids are fossil casts Limestone 121.0-121.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, <30% coverage of <1/16" voids on surface, poorly fossiliferous 121.9-122.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl 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 5/2), fine grained, mild to moderate HCl reaction, weak (R2), 90% coverage of 1/16" voids on surface, moderately fossiliferous No Recovery 123.0-126.0'	R4: 10 minutes	
			2	108.3' - Fracture, 10 deg, rough, undulating, open up to 3/16"			
			2	108.8' - Fracture, 60 deg, rough, undulating, tight			
			1	109.2' - Fracture, 45 deg, rough, undulating, open up to 1/16"			
			3	109.7' - Fracture, 10 deg, rough, undulating, open			
			1	110.6' - Fracture, 65 deg, rough, undulating, tight			
			3	110.8' - Fracture, 10 deg, rough, undulating, open to 1/16"			
			2	111.2' - Fracture, 45 deg, smooth, undulating, dark staining on 60%			
			0	112.5, 112.7, 112.8' - Fractures (3), 0-45 deg, rough, undulating, open			
			2	113.2, 113.9' - Fractures (2), horizontal, rough, undulating, 3/16" relief, open			
115 -72.7	R5-NQ 5 ft 100%	75	0	113.8' - Mechanical break			
			2	115.2' - Fracture, horizontal, rough, undulating, open			
			2	115.7' - Mechanical break, rounded ends			
			1	116.4' - Fracture, 60 deg, rough, undulating, tight to 1/16" open			
			1	116.9' - Fracture, 5 deg, smooth, undulating, open			
			4	117.8' - Fracture or mechanical break, 5 deg, rough, undulating, tight to open 1/16"			
			1	118.1, 118.9' - Fractures (2), horizontal, smooth, undulating, dark staining, open			
			1	118.3, 118.5' - Fractures or mechanical break (2), 10 deg and 20 deg, rough, undulating, tight			
			3	119.7' - Fracture or mechanical break, 10 deg, rough, undulating, tight to open 1/16"			
120 -77.7	R6-NQ 5 ft 100%	68	1	120.1-120.4' - Fractures, 0-45 deg, dark staining at 120.4', open			
			>10	121.9' - Fracture, horizontal, rough, undulating, rounded surface, open			
			NR	122.0-122.4' - Fractures, 0-90 deg, rough, undulating, open			
			18	122.7' - Fracture or mechanical break, 20 deg, rough, undulating, open to 1/16"			
125 -82.7	R7-NQ 5 ft 40%	18	NR				
			4	126.3-126.5' - Fractures, 0-45 deg, open, fragments up to 1-1/2"			
			1	126.6' - Fracture, horizontal, rough, undulating, relief 3/16" open			
			>10				
	R8-NQ						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 8 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 ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
130 -87.7	5 ft 66%	40	NR	126.9' - Fracture or mechanical break, horizontal, rough, undulating, tight to 1/16" open	Limestone 126.0-126.9' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, weak (R2), 75% coverage of 1/16" voids on surface, <5% coverage of larger voids (up to 3/16") on surface, moderately fossiliferous 126.9-128.5' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction, very weak to weak (R1 to R2), 90% coverage of 1/16" voids on surface, poorly fossiliferous No Recovery 128.5-129.1' Limestone 129.1-129.8' - light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2), 85% coverage of 1/16" voids on surface, few larger (up to 1/8") at 129.1-129.3' No Recovery 129.8-131.0' Limestone 131.0-131.2' - dusky yellow, (5Y 6/4), moderate HCl reaction, very weak to weak (R1 to R2), 90% coverage of 1/16" voids on surface No Recovery 131.2-131.5' Limestone 131.5-132.7' - Same as 131.0-131.2' No Recovery 132.7-133.6' Limestone 133.6-134.7' - Same as 131.0-131.2' except with fossil molds and casts up to 3/8" over <5% of surface No Recovery 134.7-136.0' Limestone 136.0-136.6' - Same as 131.0-131.2' except more abundant larger voids (1/16"-3/16"), moderately fossiliferous No Recovery 136.6-137.4' Limestone 137.4-138.2' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), moderate to strong HCl reaction, medium strong to strong (R3 to R4), laminated layers, laminations are at angle of 10 deg, some have 1/16" voids, otherwise small voids are limited to a few small areas, few fossil molds No Recovery 138.2-141.0' Limestone 141.0-141.2' - Same as 138.9-139.0' 141.2-141.8' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction, weak (R2), 85% coverage of 1/16" voids on surface	After substantial downtime due to casing/core barrel lock, the borehole has been reamed inside HW casing with 3-7/8" tricone bit to 126.0', HW casing spun to 126.0' (NQ is at 126.0' also)	
			2	127.9' - Fracture, horizontal, rough, undulating, open to 3/8"			
			NR	128.1-128.5' - Fracture zone, 0-90 deg, open, fragments up to 1-1/2"			
			0	129.1' - Fracture, horizontal, rough, undulating, open, thin layer of carbonate derived silt face			
			>10	129.8' - Fracture, horizontal, rough, undulating, open			C. LeBlanc begins logging Driller's Remark: Soft drilling at 128.5'
			>10	131.2-131.7' - Fracture zone, 0-70 deg, rough, undulating, open			Driller's Remark: Soft drilling below 130.0'
			NR	132.1' - Mechanical break			R8: 9 minutes
			>10	132.7' - Fracture, 60 deg, rough, undulating			No recovery intervals at 131.2-131.5' and 132.7-133.6' based on drilling rate
			0	133.6' - Fracture, horizontal, smooth, undulating, open, film of carbonate derived silt infill			Driller's Remark: Soft drilling
			NR	133.9' - Mechanical break			Driller's Remark: Soft drilling
			3	136.2, 136.5, 136.6' - Fractures (3), horizontal, rough, undulating, open			Driller's Remark: Soft drilling
			NR				R9: 7 minutes
			2	137.4' - Fracture, horizontal, smooth, planar to stepped, open			
			3	137.9' - Fracture, 5 deg, rough, undulating, dark staining, open up to 1/16"			
			NR	138' - Fracture, 45 deg, smooth, undulating, dark staining, open up to 3/16"			
			NR	138.1, 138.9' - Fractures (2), horizontal, rough, undulating, open			
			>10	141.0-141.8' - Fracture zone, 0-75 deg, black staining on some surfaces, open		R10: 6 minutes	
			0				
			13				
			NR				
			>10	146.0-146.9' - Fracture zone, 0-60 deg, rough, undulating			
			3	147.2, 147.4, 147.8' - Fractures (3), horizontal, rough, undulating, black staining, open, faces don't match		R11: 3 minutes	



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical

WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
150 -107.7	5 ft 66%	18	3	148.2' - Fracture or mechanical break, 25 deg, rough, undulating, tight to open 3/16"		[Symbolic Log]	141.8-142.5' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak (R2), 80% coverage of 1/16" voids on surface, fossil molds (3/16") from 141.8-142.1', layer without voids from 142.3-142.5' No Recovery 142.5-146.0' Limestone	R12: 13 minutes
			0	148.3' - Fracture, 25 deg, smooth, undulating, open 148.6' - Fracture or mechanical break, 45 deg, rough, undulating, tight to 3/8" open				
155 -112.7	R13-NQ 5 ft 82%	71	1	151.8' - Fracture, 10 deg, rough, undulating, open		[Symbolic Log]	146.0-146.9' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), 75% coverage of <1/16" voids on surface, larger voids (up to 9/16") over 10% of surface 146.9-149.3' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, medium strong (R3), <5% coverage of 1/16" voids on surface, most being below 148.5', few larger <3/16" voids (fossil molds) below 148.5' No Recovery 149.3-151.0' Limestone	R13: 12 minutes
			2	152.1' - Fracture or mechanical break, 10 deg, rough, planar, tight to open up to 3/16"				
			1	152.8' - Fracture, horizontal, rough, undulating, open up to 3/16"				
			2	153.3' - Fracture, horizontal, rough, undulating, dark staining on lower face, open 154.1' - Mechanical break				
			0	154.6' - Fracture, horizontal, rough, undulating, open to 3/16"				
			NR					
160 -117.7	R14-NQ 5 ft 90%	50	2	156.75, 156.85' - Fractures (2), horizontal, rough, undulating, open		[Symbolic Log]	151.0-155.1' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, moderate HCl reaction, weak (R2), 90% coverage of 1/16" voids on surface to 154.2', then only over 40% of surface, cavities (fossil molds) up to 3/8" up to 5% of surface throughout interval No Recovery 155.1-156.0' Limestone	R14: 14 minutes
			>10	157.2-157.9' - Fracture zone, horizontal, rough, undulating, every 0.05-0.1' is a fracture, open to 3/16", rock fragments from 157.6-157.8"				
			4	158.2, 158.7, 158.9, 159.1' - Fractures (4), horizontal, rough, undulating, olive brown staining on face at 158.7', open, faces do not match				
			3	159.2, 159.9, 160.0' - Fractures (3), horizontal, rough, undulating, rounded at 159.2', faces match poorly				
			1					
			NR					
165 -122.7	R15-NQ 5 ft 46%	28	0	162.0, 162.3' - Fractures (2), horizontal and 10 deg, undulating, black staining on lower face at 162.0', rough at 162.3', smooth at 162.6', faces poorly match		[Symbolic Log]	158.1-158.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), laminated with dusky yellow 5Y 6/4, laminations are irregular and uneven, <1/16" voids present along laminations 158.9-160.5' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), <1/16" voids, few fossil molds (up to 3/16") No Recovery 160.5-161.0' Limestone	R15: 5 minutes
			4	162.7' - Fracture, 5 deg, planar, coarse grained bedding plane				
			4	163.0' - Fracture, horizontal, rough, planar, open				
			NR	163.0-163.3' - Fractures, horizontal, rough, dark staining on upper face at 163.2', planar to undulating, faces match poorly 163.7' - Fracture or mechanical break, horizontal, rough, undulating, tight to 3/16" open				
			3	166.1, 166.4, 166.8' - Fractures (3), horizontal, rough, undulating, faces match poorly, open up to 3/8"				
			>10					
	R16-NQ							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18	SHEET 10 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 ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION		
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		
170 -127.7	5 ft 62%	23	2	167.0-167.6' - Fracture zone, 0-90 deg, black staining on vertical faces, fragments from 3/16" to 3-1/2", faces match poorly	Limestone 166.0-169.1' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), 10% coverage of 1/16" voids on surface, few larger (up to 3/16") voids and fossil molds, except from about 166.9-167.4', zone from 167.5-167.9' has no voids but is laminated with darker zone from 167.7-167.9', brass colored to dark colored staining on broken surface across darker zone No Recovery 169.1-171.0' Limestone 171.0-172.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), some <3/16" fossil molds 172.0-173.5' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), 50% coverage of 1/16" voids on surface, larger (up to 3/8") voids up to 5%, moderately fossiliferous 173.5-175.4' - Same as 171.0-172.0' No Recovery 175.4-176.0' Limestone 176.0-180.7' - Same as 172.0-173.5' except fewer large voids and fossil molds, poorly fossiliferous	R16: 18 minutes			
			0	167.9' - Fracture zone, horizontal, rough, undulating, open to 3/16"					
		NR	3	168.3' - Fracture, horizontal, rough, undulating, open					
			3	168.5' - Fracture, horizontal, rough, undulating on upper face, smooth and planar on lower, open, some 3/8" fragments					
		175 -132.7	R17-NQ 5 ft 88%	34			3	169.0' - Mechanical break	R17: 16 minutes
							3	171.1, 171.2' - Fractures (2), horizontal, smooth, planar, open up to 3/16"	
							2	172.0' - Fracture or mechanical break, 45 deg, rough, undulating	
							5	172.2' - Fracture or mechanical break, horizontal, rough, undulating, open up to 3/8"	
							1	172.3-172.7' - Mechanical break or fractures, 0-65 deg, open to 3/16"	
							NR	173.4, 173.6' - Fractures (2), horizontal, smooth, planar, open to 3/16"	
180 -137.7	R18-NQ 5 ft 94%	46	3	174.1, 174.2, 174.3' - Fractures (3), 0-5 deg, smooth, planar, open up to 3/16"	R18: 19 minutes				
			8	174.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1/16"					
			2	174.8, 175.1' - Fractures (2), horizontal, rough, undulating on upper face and planar on lower face					
			5	176.4, 176.6' - Fractures (2), horizontal, rough, undulating, open to 3/16"					
			2	176.7' - Fracture, horizontal, smooth, planar, open to 1/16"					
			NR	177.1, 177.15, 177.2, 177.4, 177.7, 177.75, 177.8, 177.9' - Fractures (8), horizontal, smooth, planar to slightly undulating, open 1/16" to 3/16"					
			>10	178.3' - Fracture, horizontal, rough, undulating, open, fragments up to 1/2"					
			0	178.9-179.4' - Fractures (4), 0-45 deg, rough, undulating, open, fragments up to 1"					
			>10	179.8, 179.9' - Fractures (2), horizontal, rough, undulating, open to 3/16"					
			NR	180.3' - Fracture, horizontal, smooth, planar to stepped, open to 3/16"					
185 -142.7	R19-NQ 5 ft 54%	18	NR	180.4' - Fracture, horizontal, rough, undulating, open, rounded faces	R19: 15 minutes				
			NR	181.0-182.0' - Fracture zone, 0-90 deg, rough, undulating, some slight dark staining at 181.6'					
			NR	182.0-183.0' - Mechanical break					
			NR	183.0-183.7' - Fracture zone, 0-90 deg, rough, undulating, fragments up to 1-1/2"					
			NR	186.0-186.4' - Fractures, horizontal, multiple 1" fragments, open					
			NR	187.8' - Fracture, horizontal, smooth, planar, open to 1/16"					
	R20-NQ 4.5 ft	37	3		Limestone 186.0-186.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak (R2), 90% coverage of <1/16" voids on surface, few cavities (up to 9/16")				
			1						



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 ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/25/07 START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
190 -147.7	69%	>10	>10	188.2-189.1' - Fracture zone, rough, undulating, fragments up to 2"	186.5-189.1' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), 40% coverage of <1/16" voids on surface to 187.3', over 90% of surface with larger (up to 3/16") below 187.3', moderately fossiliferous	R20: 14 minutes R21: 52 minutes	
190.5	NR	3	190.7, 190.9, 191.5' - Fractures (3), horizontal, rough, undulating, black staining on face at 190.9', open up to 3/8"				
195 -152.7	R21-NQ 5 ft 76%	17	3	191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16"	190.5-194.3' - yellowish gray, (5Y 7/2), fine grained, moderate 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 fossiliferous in same zone, color grades to dusky yellow (5Y 6/4) by 193.0', dark thin (1/16") irregular laminations visible at 192.5-192.7'	On 3/7/07 all day was spent addressing/fixing borehole cave-in issues, casing was set to 175.0' drilled with tricone bit to 190.5'	
195.5	NR	>10	191.9' - Fracture, 45 deg, rough, undulating, open				
200 -157.7	R22-NQ 5 ft 80%	20	>10	192.7-194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" long	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	R22: 17 minutes	
200.5	NR	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"				
			2	196.9' - Fracture or mechanical break, rough, undulating, open 3/8"	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		
			>10	197.4-197.6' - Fractures, open, fragments up to 1"			
			>10	197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2"	No Recovery 199.5-200.5'		
			NR		Bottom of Boring at 200.5 ft bgs on 3/8/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18A
SHEET 1 OF 6	
<h2 style="margin: 0;">SOIL BORING LOG</h2>	

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 bgs on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			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
		#TYPE					
42.1							06/14/07 Drill 10.0' pilot hole, install 10.0' of SW (6") casing Blind drill to 25.0'
5 37.1							Water level obtained from boring A-18
10 32.1							
15 27.1							
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.1						
25	25.0					
17.1	1.3	SS-1	20-24-23 (47)	Fat Clay With Sand (CH) 25.0-25.05' - light bluish gray, (5B 7/1), wet, very stiff, high plasticity, no dilatancy, no HCl reaction, 15% very fine to fine silica sand, (slough)		
	26.5			Silty Sand (SM) 25.05-26.35' - yellowish gray, (5Y 8/1), wet, dense, fine to coarse grained sand-sized, moderate HCl reaction, 24% nonplastic fines, all carbonate		06/15/07 Install 5' more of SW casing Begin split spoon sampling at 25.0' 09:00 Pull out split spoon 25.0-26.5'
30	30.0					
12.1	0.5	SS-2	50/5.5 (50/5.5")	Silty Sand (SM) 30.0-30.5' - Same as 25.05-26.35' except grayish orange, (10YR 7/4) Begin Rock Coring at 30.5 ft bgs See the next sheet for the rock core log		09:15 Pull out 30.0-31.5' interval SPT; decide to start rock coring
35						
7.1						
40						



PROJECT NUMBER: 338884.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 bgs on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
30.5	R1-NQ 5 ft 0%	0	NR		No Recovery 30.5-35.5'	09:55 Begin rock coring Driller's Remark: Sand layer that washed out (30.5-35.5') - felt resistance during drilling R1: 4 minutes	
35 7.1							
35.5	R2-NQ 5 ft 80%	60	0		Limestone 35.5-39.5' - pale olive, (10Y 6/2), very fine to fine grained, moderate to strong HCl reaction, very weak (R1), 15% surface voids (<1/16") 35.5-38.5', 40% surface voids from 38.5-38.5', many cavities up to 3/16"x9/16", many fossil molds with minor silt infill, sporadic black (organic) material up to 3/16", trace (few) fossil casts	SC-1 collected at 37.45-38.55'	
40 2.1					No Recovery 39.5-40.5'	R2: 8 minutes	
40.5	R3-NQ 5 ft 48%	31	NR		Limestone 40.5-42.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, weak (R2), extremely weak rock (R0) from 42.2-42.9', 40.5-42.2' 40% small surface voids (<1/16"), many small cavities up to 3/16" in diameter, few fossil molds and casts, moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into void space, few fossil molds	Core run times not recorded beyond run R2-NQ	
45 -2.9					No Recovery 42.9-45.5'		
45.5	R4-NQ 5 ft 98%	63	NR		Limestone 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), 25-40% surface voids (<1/16") variable over core, void infill, many cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils up to 3/16" in diameter, horizontal black laminations from 47.4-47.8' varying in size up to 3/16" thick, fine grained with local medium grained accumulations		
50 -7.9							
50.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-18A	SHEET 4 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 on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
55 -12.9	R5-NQ 5 ft 96%	73	NR	0			No Recovery 50.4-50.5' Limestone 50.5-55.3' - pale yellowish brown, (10YR 4/2), moderate HCl reaction, extremely weak (R0), small surface voids (<1/16") 15-25% variable over core length, many cavities up to 9/16"x3/16", trace black elongate shaped material (organics) up to 9/16"x1/16", trace black lineations from 51.65-51.85', fine grained with local medium grained accumulations	
			2	2	51.5, 53.8' - Mechanical break, 60 deg, tight 51.85' - Mechanical break, 50 deg, tight			
			3	3	52.85, 53.85, 53.95, 54.5' - Mechanical break, horizontal, tight			
			3	3				
			1	1				
60 -17.9	R6-NQ 5 ft 100%	82	NR	3	55.75, 55.9, 56.15, 56.63, 57.02, 57.4, 57.9, 58.4, 59.08' - Mechanical break, <10 deg, rough, planar, tight		No Recovery 55.3-55.5' Limestone 55.5-60.5' - Same as 50.5-55.3' except 5-15% surface voids (<1/16"), many black lineations throughout, few cavities up to 1/8" diameter	
			3	3				
			3	3	57.6' - Mechanical break, 50 deg, rough, planar, tight			
			1	1				
			0	0				
65 -22.9	R7-NQ 5 ft 100%	88	3	3	61.0' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		Limestone 60.5-61.1' - pale yellowish brown, (10YR 4/2), moderate HCl reaction, weak (R2), hard, moderate density, fossiliferous, small voids and fossil molds (1/16"-1/8") over 10-15% of surface Limestone 61.1-65.5' - pale yellowish brown, (10YR 4/2), moderate HCl reaction, extremely weak to weak (R0 to R2), hard, localized zones of small voids (1/16"-1/8") up to 15% of surface, very sparse black organic inclusions	
			2	2	61.1' - Mechanical break, 40 deg, rough, undulating, tight			
			2	2	61.5, 61.9, 62.46, 63.05, 64.0, 64.6, 65.23' - Mechanical break, <10 deg, rough, planar to undulating, tight			
			2	2				
			1	1				
70 -27.9	R8-NQ 5 ft 100%	86	1	1	66.5' - Fracture (2), 50 deg, rough, stepped, tight, intersecting		Limestone 65.5-70.5' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), some of the rock from 68.0-70.5' poorly fossiliferous, up to 3/16" thick, sparse very thin (<1/16" thick) lineations, few cavities up to 1/16"x1/8", few black blebs up to 3/16" diameter, mostly fine grained	SC-2 collected at 69.12-70.23'
			3	3	66.9, 67.13, 67.8, 69.13, 70.2' - Bedding plane or mechanical break, <5 deg, rough, planar to undulating, tight to open (up to 1/4")			
			1	1				
			1	1				
			2	2				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
75 -32.9	R9-NQ 5 ft 85%	52	2	70.25' - Fracture, 70 deg, rough, planar	Limestone 70.5-74.75' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, weak (R2), 25% surface voids (<1/16") from 70.5-73.0', 50% surface voids (<1/16") from 73.0-74.75', many cavities up to 3/8", very fossiliferous, many molds, casts, trace black (organics) lineations No Recovery 74.75-75.5'	11:40 20.0' More HW casing put in to 50.0'	
		2	71.1, 72.15, 72.25' - Fracture, 50 deg, smooth, undulating, open (up to 1/4")				
		3	71.2' - Bedding plane, horizontal, rough, planar, black staining, open (1/8")				
		6	72.6' - Fracture (2), 60 deg and 5 deg, rough, undulating, tight, intersecting				
		>10	73.03' - Mechanical break or bedding plane, rough, planar, tight to open (1/16")				
		NR	73.9, 74.0, 74.15, 74.3, 74.5, 74.6' - Bedding plane, <10 deg, rough, undulating to stepped, open (up to 3/4")				
80 -37.9	R10-NQ 5 ft 67%	33	2	74.6-74.75' - Fracture zone	Limestone 75.5-78.85' - Same as 70.5-74.75' except extremely weak (R0), black organic material up to 1"x1/8" No Recovery 78.85-80.5'		
		>10	75.5-75.6' - part of core is fractured				
		5	75.9, 76.6' - Fracture (2), 50 deg, rough, planar, open (up to 3/4")				
85 -42.9	R11-NQ 5 ft 8%	0	NR	76.95-77.3' - Fracture zone	Limestone 80.5-80.9' - Same as 75.5-78.85' except pale olive, (10Y 6/2) No Recovery 80.9-85.5'		
		>10	80.5-80.9' - Fracture zone				
90 -47.9	R12-NQ 5 ft 52%	43	1	80.5-80.9' - Fracture zone	Limestone 85.5-88.1' - light olive gray to dusky yellow, (5Y 5/2 to 5Y 6/4), strong HCl reaction, weak (R2), 87.7-88.1' extremely weak rock (R0), 40-50% surface voids (<1/16") many cavities up to 3/8"x3/16", highly fossiliferous, many (>5) molds, few casts, minor recrystallization No Recovery 88.1-90.5'	SC-3 collected at 86.9-87.72'	
		1	86.15' - Mechanical break or bedding plane, 30 deg, rough, undulating, tight				
		>10	86.9' - Mechanical break or bedding plane, horizontal, rough, undulating, tight				
		NR	87.72-88.1' - Fracture zone				



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 on 3/25/07 START : 6/14/2007 END : 6/15/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
95 -52.9	R13-NQ 5 ft 90%	57	>10 >10 4 2 0 NR	90.78' - Mechanical break or bedding plane, horizontal, rough, stepped, tight 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 91.9' - Fracture, smooth, stepped, missing part of fracture 92.6, 92.7, 93.4, 94.25' - Bedding plane, <25 deg, rough, stepped, fragments in fractures, open (up to 1") 93.8' - Bedding plane or mechanical break, 30 deg, rough, undulating, tight	Limestone 90.5-95.0' - Same as 85.5-88.1' except very fossiliferous with many cavities up to 1-3/4"x1-3/16", minor silt infill, secondary carbonate crystals within cavities and voids space present, minor black staining in some cavities No Recovery 95.0-95.5' Limestone 95.5-97.35' - Same as 85.5-88.1' except 15-25% surface voids (<1/16") No Recovery 97.35-100.5'		
100 -57.9	R14-NQ 5 ft 37%	32	1 1 NR	95.95' - Bedding plane or mechanical break, 10 deg, smooth, undulating, tight 96.6' - Bedding plane, smooth, undulating, open (3/4-2"), fragments in fracture, also 50 degree fracture smooth, undulating, black staining			
					Bottom of Boring at 100.5 ft bgs on 6/15/2007	6/15/07 15:30, Total depth of boring 100.5'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-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
 WATER LEVELS : 2.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
43.1	0.0			Poorly Graded Sand With Silt And Gravel (SP-SM) 0.0-0.5' - grayish yellow, (5Y 8/4), dry, loose, fine to coarse grained sand and gravel, 11% fines, limestone road base		Water level at 2.0' below ground surface
	1.5	SS-1	3-3-3-3 (6)	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 nonplastic fines, up to 25% organics, wood fragments		
	2.0			Silty Sand (SM) 2.0-2.5' - grayish brown, (5YR 5/2), wet, loose, fine grained, 20% nonplastic fines, fines may be organics		
	1.2	SS-2	2-4-4-6 (8)	Poorly Graded Sand With Silt (SP-SM) 2.5-3.2' - grayish orange, (10YR 5/6), wet, loose, fine grained, 5-10% nonplastic fines		
	4.0			Silty Sand (SM) 4.0-5.4' - light gray, (N8), wet, loose, fine grained, 20-25% low plastic fines, trace fine sand-sized black minerals		
5	1.4	SS-3	3-3-4-4 (7)	Silty Sand (SM) 6.0-7.2' - light gray to medium gray, (N7 to N6), wet, very loose, fine grained, 20% low plastic fines		
38.1	6.0			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 grained sand, 5% wood and organics		
	1.6	SS-4	2-2-1-0 (3)	Fat Clay With Sand (CH) 8.0-8.4' - medium gray to dark gray, (N4 to N3), wet, stiff, high plasticity, no dilatancy, 15-20% fine grained sand, 5% wood fragments		
	0.9	SS-5	2-3-7-12 (10)	Silt With Sand (ML) 8.4-8.9' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 18% fine grained sand		
10	10.0			Silty Gravel With Sand (GM) 10.0-10.9' - grayish orange, (10YR 7/4), moist, very dense, moderate to strong HCl reaction, fine to coarse gravel-sized up to 2", 25% fine to coarse grained sand, 15-20% low plastic fines		
33.1	0.9	SS-6	3-47-11-9 (58)	Silt With Sand (ML) 12.0-12.9' - grayish orange, (10YR 7/4), moist to wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% fine grained sand, 5% medium to coarse grained sand		
	12.0			Limestone And Silt (ML) 14.0-14.7' - moderate olive brown, (5Y 4/4), moderate HCl reaction, coarse sand to coarse gravel-sized, angular to subrounded limestone fragments, with silt that is grayish yellow (5Y 8/4), wet, very stiff, 10-15% fine grained sand, moderate to strong HCl reaction		
	0.9	SS-7	6-12-8-10 (20)	Silt (ML) 16.0-17.3' - yellowish gray, (5Y 7/2), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 6% fine grained sand		
15	0.7	SS-8	3-8-9-8 (17)	Limestone Fragments 18.0-18.2' - moderate to dark yellowish orange, (10YR 5/4 to 10YR 6/6), strong HCl reaction, fine to coarse gravel-sized, angular fragments up to 2"		
28.1	16.0			Silt (ML) 18.2-19.4' - Same as 16.0-17.3'		
	1.3	SS-9	9-13-18-30 (31)			
	18.0					
	1.4	SS-10	12-18-25-13 (43)			
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 2 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
 WATER LEVELS : 2.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
23.1	20.0	1.4	SS-11	12-19-17-17 (36) Silt (ML) 20.0-21.4' - Same as 16.0-17.3' except 10-15% fine grained sand, trace medium to coarse grained sand		
	22.0	1.7	SS-12	38-43-38-44 (81) Sandy Silt (ML) 22.0-22.5' - grayish orange, (10YR 7/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 33% very fine to coarse grained sand		
	24.0			Silt (ML) 22.5-23.7' - Same as 22.0-22.5' except 10-15% fine grained sand		
25		1.4	SS-13	37-27-20-31 (47) Silt (ML) 24.0-25.4' - Same as 22.5-23.7'		
18.1	26.0	1.4	SS-14	21-18-16-11 (34) Sandy Silt (ML) 26.0-27.4' - Same as 22.0-22.5'		
	28.0	1.7	SS-15	4-3-2-17 (5) Sandy Silt (ML) 28.0-29.7' - yellowish gray, (5Y 7/2), moist to wet, medium stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 32% fine to coarse grained sand		
30	30.0	1.4	SS-16	10-20-21-50/3 (41) Sandy Silt To Silt (ML) 30.0-31.4' - yellowish gray, (5Y 7/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 25-30% fine to coarse grained sand, decreasing to 10-15% fine grained sand at 30.0-30.3', thin laminae, white calcareous stringers <1/16" thick, oriented horizontal to 30 deg		
13.1	31.8					
	32.0	0.3	SS-17	50/5 (50/5") Sandy Silt With Limestone (ML) 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, 20% disc-shaped limestone fragments up to 1/10" thick		
	32.4					
	34.0	0.4	SS-18	50/5 (50/5") Limestone And Sandy Silt (GM) 34.0-34.4' - Same as 32.0-32.3' except low plasticity, mild to moderate HCl reaction, 75% fine to coarse grained sand and fine to coarse gravel-sized; 25% silt		
35	34.4					
8.1	36.0	0.1	SS-19	50/1 (50/1") Limestone Fragments 36.0-36.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, 3 coarse gravel-sized pieces recovered Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log		SPT discontinued at 36.0' Surface casing set to 36.0'
	36.1					
40						



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 on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
36.0	R1-HQ 5 ft 20%	0	>10	36.0-37.0' - Fracture zone, rough, undulating, rounded limestone fragments, some surface staining	Limestone 36.0-36.5' - yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2) 36.5-37.0' - pale yellowish brown, (10YR 6/2), fine to very fine grained, mild HCl reaction, extremely weak (R0), friable, voids over 80-90% of surface No Recovery 37.0-41.0'	Driller's Remark: Soft at 40.0-41.0' R1: 7 minutes	
40 3.1		NR					
41.0	R2-HQ 5 ft 78%	35	4	41.1' - Fracture, horizontal, smooth, planar, open 3/8"	Limestone 41.0-43.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), thin bedding, very friable, thinly laminated from 41.3-41.55' 43.5-44.9' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, weak to extremely weak (R2 to R0), trace organics, voids over 40-50% of surface becoming larger with depth, trace organic material No Recovery 44.9-46.0'	R2: 2 minutes	
45 -1.9		2	41.35' - Fracture, <5 deg, smooth, undulating, open 3/4"				
		3	41.6-41.9' - Fracture zone, 0 to <5 deg, rough, stepped				
		3	42.3' - Fracture, <5 deg, smooth, undulating, open 3/4"				
		NR	42.7' - Fracture, horizontal, rough, planar, open 3/4"-1-3/16"				
46.0	R3-HQ 5 ft 88%	20	4	43.0, 43.9' - Fractures (2), horizontal, rough, undulating, open 3/16" at 43.0', open 3/8" at 43.9'	Limestone 46.0-50.4' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, extremely weak (R0), trace organics, voids over 10-15% of surface No Recovery 50.4-51.0'	R3: No runtime recorded	
50 -6.9		3	44.4, 44.6' - Fractures (2), horizontal, rough, undulating, open 3/16"-3/8"				
		3	44.7' - Fracture, <5 to 40 deg, rough, undulating				
		2	46.2' - Fracture, horizontal, smooth, planar, open 1/16"				
		3	46.4' - Fracture, horizontal, rough, undulating, open 3/16"				
		NR	46.6' - Fracture, horizontal, smooth, planar, tight				
51.0	R4-HQ 5 ft 46%	0	>10	46.9, 47.15' - Fractures (2), horizontal, rough, undulating, open 1/16"-3/16"	Limestone 51.0-53.3' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids on 15-25% of surface, cavity up to 3/8" length at 52.3' No Recovery 53.3-56.0'	R4: 4 minutes	
55 -11.9		>10	47.30' - Fracture, <5 deg, rough, undulating, tight				
		>10	47.85' - Fracture, horizontal, smooth, undulating, open <1/16"				
		>10	48.03, 48.55' - Fractures (2), horizontal, smooth, planar, tight				
		NR	48.85, 49.35' - Fractures (2), smooth, planar to undulating, tight				
56.0				49.60' - Fracture, <5 deg, smooth, stepped, tight			
				50.0' - Fracture, <5 to 30 deg, rough, stepped, open 3/8"			
				50.2' - Fracture, rough, planar to undulating, open 3/8"			
				50.4' - Fracture, horizontal, smooth, planar, open			
				51.0-51.7' - Fracture zone			
				51.7' - Fracture, 80 deg, rough, undulating, 0.4' long, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 4 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
60 -16.9 61.0	R5-HQ 5 ft 98%	87	1	52.9' - Fracture zone, <5 to 90 deg, rough, undulating	[Symbolic Log]	Limestone 56.0-60.9' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids variable from 1-2% to 20-25% of surface	SC-1 collected at 58.0-59.3' R5: 4 minutes
			1	56.6' - Fracture zone, 80 to 90 deg, rough, undulating			
			0	58.0' - Fracture, 30 deg, smooth, planar, open			
			2	59.3' - Fracture, horizontal, smooth, planar, open			
			1	59.9' - Fracture, horizontal, smooth, planar, open <1/16"			
			NR	60.5' - Fracture, horizontal, smooth, stepped, open 3/8"			
			3	61.3, 61.75' - Fractures (2), horizontal, smooth, planar, open 3/16"			
			2	62.8' - Fracture, horizontal, smooth, planar, tight			
			0	63.0' - Fracture, horizontal, smooth, stepped, tight			
			1	64.4' - Fracture, 50 deg, smooth, stepped, open			
65 -21.9 66.0	R6-HQ 5 ft 100%	90	1	65.5' - Fracture, horizontal, smooth, undulating, open	[Symbolic Log]	No Recovery 60.9-61.0' Limestone 61.0-66.0' - Same as 56.0-60.9' except cavities vary from 15-20% decreasing with depth, trace organics as thin discontinuous laminae	SC-2 collected at 64.5-65.5' R6: 4 minutes
			2	66.1' - Fracture, horizontal, smooth, planar, open			
			3	66.8' - Fracture, <5 deg, smooth, stepped, open			
			1	67.03' - Fracture, <5 deg, smooth, undulating, tight			
			1	67.35' - Fracture, horizontal, smooth, planar, open			
			2	67.9' - Fracture, 0 to 50 deg, rough, stepped, open			
			0	68.45' - Fracture, 70 deg, smooth, planar, tight			
			NR	69.6, 69.7' - Fracture (2), 0 to 50 deg, rough, undulating, open			
			2	71.25' - Fracture, horizontal, smooth, undulating, tight to open 3/16"			
			0	71.8' - Fracture, horizontal, smooth, stepped, tight, organic black covering 15-20% of surface			
70 -26.9 71.0	R7-HQ 5 ft 97%	65	1	73.55' - Fracture, horizontal, smooth, planar, open	[Symbolic Log]	Limestone 66.0-68.5' - Same as 61.0-66.0' 68.5-70.85' - yellowish gray, (5Y 7/2), very fine to fine grained, no to moderate HCl reaction, very weak to weak (R1 to R2), some strong hydrochloric acid reaction in some cavities, voids over 20-25% of surface, trace cavities to 3/8"x3/16"	SC-3 collected at 69.7-70.85' R7: No runtime recorded
			2	71.25' - Fracture, horizontal, smooth, undulating, tight to open 3/16"			
			0	71.8' - Fracture, horizontal, smooth, stepped, tight, organic black covering 15-20% of surface			
			1	73.55' - Fracture, horizontal, smooth, planar, open			
			2	74.8' - Fracture, horizontal, smooth, undulating, tight			
			NR	70.85-71.0' - Fracture, horizontal, smooth, undulating, tight			
			2	71.0-71.3' - Same as 68.5-70.85'			
			0	71.3-73.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine to fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), laminated in zones with black organic material, fossil plant impression along fracture and bedding planes, voids <5%, trace cavities			
			1	73.55' - Fracture, horizontal, smooth, planar, open			
			2	73.5-76.0' - Same as 68.5-70.85'			
75 -31.9 76.0	R8-HQ 5 ft 100%	88	1	73.55' - Fracture, horizontal, smooth, planar, open	[Symbolic Log]	No Recovery 70.85-71.0' Limestone 71.0-71.3' - Same as 68.5-70.85' 71.3-73.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine to fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), laminated in zones with black organic material, fossil plant impression along fracture and bedding planes, voids <5%, trace cavities	SC-4 collected at 74.9-75.7' R8: 9 minutes
			1	74.8' - Fracture, horizontal, smooth, undulating, tight			
			2	73.5-76.0' - Same as 68.5-70.85'			
			NR	71.0-71.3' - Same as 68.5-70.85'			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 5 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
80 -36.9	R9-HQ 5 ft 67%	30	>10 >10 NR 1 1	75.6, 75.9' - Fractures (2), <5 deg, rough, stepped 76.0-77.5' - Fracture zone 79.65, 80.0' - Fractures (2), <5 deg, rough, stepped, open 3/8-3/4"	Limestone 76.0-77.5' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids on 15-25% of surface, friable No Recovery 77.5-78.5' Limestone 78.5-80.35' - yellowish gray, (5Y 7/2), fine to very fine grained, no to mild HCl reaction, becoming very soft (clay like) at base, organic material in clayey to sandy limestone material No Recovery 80.35-81.0'	SC-5 collected at 78.5-79.65' R9: 3 minutes	
85 -41.9	R10-HQ 5 ft 100%	46	0 1 >10 >10 >10	82.7' - Fracture, 45 deg, rough, stepped, open, dark brown clay over 50% surface 82.9-83.1' - Fracture zone, <5 deg, undulating, thin brown clay lined <1/16", thick covering 100% surface 83.7-86.0' - Fracture, <5 deg, rough, stepped, open, various fractures having different orientations	Limestone 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 interbedded clay to sand sized carbonate grains, some organic material	SC-6 collected at 81-82.75' R10: 7 minutes	
90 -46.9	R11-HQ 5 ft 79%	48	3 0 10 >10 NR	86.1' - Fracture, 30 to 40 deg, smooth, planar, open 86.4' - Fracture, horizontal, rough, stepped 86.95' - Fracture, 30 deg, rough, stepped, tight 88.65' - Fracture, 60 deg, rough, planar 88.9-89.1' - Fracture zone, <5 deg, rough, stepped, open 89.4' - Fracture zone, 0 to 60 deg, rough, undulating, tight	86.0-89.0' - Same as 81.0-86.0' except cavities up to 3/4" over 1-5% of surface 89.0-89.95' - yellowish gray with light olive brown mottling, (5Y 7/2 with 5Y 5/6), mild to moderate HCl reaction, voids on 5-10% of surface, rare small cavities, friable No Recovery 89.95-91.0'	SC-7 collected at 87.3-88.7' R11: 9 minutes	
95 -51.9	R12-HQ 5 ft 100%	56	2 1 2 2 10	91.1' - Fracture, horizontal, smooth, planar, open 91.3' - Fracture, 10 deg, smooth, planar, tight 92.8' - Fracture, 90 to 80 deg, rough, planar, tight 93.5' - Fracture, horizontal, smooth, planar, open 93.9' - Fracture, horizontal, rough, planar, open 94.6' - Fracture, 80 deg, rough, planar 95.1-95.65' - Fracture, horizontal, smooth, planar, open	Limestone 91.0-91.3' - moderate olive brown to olive gray, (5Y 4/4 to 5Y 3/2), fine to very fine grained, moderate HCl reaction, extremely weak (R0), organics 91.3-94.5' - Same as 86.0-89.0' except thinly laminated at 91.3-91.4', with organics	SC-8 collected at 94.6-95.4' R12: 9 minutes	
96.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 6 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
100 -56.9	R13-HQ 5 ft 96%	70	3	96.4' - Fracture, 0 to 90 deg, rough, undulating, open	Limestone 94.5-96.0' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, very weak to medium strong (R1 to R3), voids over less than 10% of surface, trace organics 96.0-97.2' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), laminated, voids over 25-30% of surface, cavities over 10-15% of surface, near base of interval, possible bioturbation at 96.5' 97.2-99.1' - yellowish gray, (5Y 7/2), very fine grained, weak to medium strong (R2 to R3), thinly laminated with thin (<1") softer zone where voids are more prevalent, voids generally <5% of surface, rare fossils 99.1-100.8' - yellowish gray, (5Y 7/2), very fine grained, moderate to mild HCl reaction, very weak to weak (R1 to R2), fossiliferous (casts/molds), increasing with depth, voids over 20-25% of surface, cavities increasing with depth No Recovery 100.8-101.0' Limestone 101.0-103.5' - Same as 99.1-100.8' except fine grained, mild HCl reaction 103.5-105.3' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), some fossils (molds/casts), voids over 25-30% of surface, cavities (up to 1/16"-1/8") over 5% No Recovery 105.3-106.0' Limestone 106.0-114.7' - Same as 103.5-105.3'	SC-9 collected at 99.35-100.35' R13: 9 minutes	
			1	96.7' - Fracture, horizontal, smooth, planar 96.8' - Fracture, continuation of 96.4'			
			2	97.8' - Fracture, 30 deg, smooth, planar 98.1' - Fracture, horizontal, smooth, planar, tight			
			1	98.85' - Fracture, horizontal, rough, undulating, tight			
			2	99.35, 100.35' - Fractures (2), horizontal, rough, undulating, open, silty infilling covering 2-3%			
			NR	100.65' - Fracture, horizontal, rough, undulating, open			SC-10 collected at 101.0-102.35'
			0				
			2	102.35' - Fracture, 30 deg, rough, undulating, open			
			1	102.5' - Fracture, 60 deg, rough, planar, tight 103.0' - Fracture, <5 deg, rough, stepped, open			
105 -61.9	R14-HQ 5 ft 86%	36	>10				R14: No runtime recorded
			>10				
			NR				
			3	106.1' - Fracture, horizontal, rough, undulating, open			
			3	106.6, 106.95' - Fractures (2), <5 deg, rough, stepped, open			
			2	107.1' - Fracture, 70 deg, rough, planar, open 107.4' - Fracture, horizontal, rough, undulating, open		SC-11 collected at 108.35-109.8'	
110 -66.9	R15-HQ 5 ft 100%	64	1	107.6' - Fracture, 70 deg, rough, undulating, tight 108.2, 108.5, 109.0, 110.1' - Fractures (4), <5 deg, rough, undulating, open		R15: No runtime recorded	
			2	110.45' - Fracture, 60 deg, rough, planar, tight			
			2	111.7, 111.9' - Fractures (2), 80 deg, rough, undulating, tight fracture, extends to 112.3'			
			2	112.3' - Fracture, <5 deg, rough, undulating, open			
			0	112.45' - Fracture, 60 deg, rough, undulating, tight		SC-12 collected at 113.5-114.7'	
			1	114.65' - Fracture, <5 deg, smooth, undulating, open			
115 -71.9	R16-HQ 5 ft 100%	78	2	115.02' - Fracture, 30 deg, rough, undulating, open		R16: No runtime recorded	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 7 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
120 -76.9	R17-HQ 5 ft 50%	17	2 NR	>10 >10	115.55' - Fracture, <5 deg, rough, undulating, open 116.2, 116.4' - Fractures (2), horizontal, rough, undulating, open 117.2-117.5' - Fracture zone, 0 to <5 deg, smooth to rough, planar to stepped, open	Limestone 114.7-115.7' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), 1/16" voids over 10-15% of surface, some cavities up to 3/8"-3/4" irregular shaped, irregular distribution, fossil casts/molds rare to absent 115.7-116.0' - Same as 103.5-105.3' except very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), <5% voids on surface 116.0-117.5' - Same as 103.5-105.3' except possible voids No Recovery 117.5-120.0' Limestone 120.0-121.0' - Same as 103.5-105.3' except light olive brown, 15-20% cavities up to 3/8" 121.0-123.1' - Same as 103.5-105.3' except light olive gray to grayish olive, (5Y 5/2 to 10Y 4/2), fossiliferous zone (cavities) at 122.8' 123.1-124.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), thinly laminated with <5% voids (up to 10-15%) 124.9-130.15' - light olive gray, (5Y 5/2), fine grained, moderate to mild HCl reaction, weak (R2)	SC-13 collected at 116.4-117.2' Driller's Remark: Possible void from 117.5-120.0' Lost circulation at 118.0'	
125 -81.9	R18-HQ 5 ft 100%	63	2 1 1 2 1	121.2' - Fracture, horizontal, rough, stepped, open 121.4' - Fracture, stepped 122.75' - Fracture, 75 deg, rough, stepped, tight 123.10' - Fracture, 40 deg, rough, undulating, tight 124.4, 124.92' - Fractures (2), horizontal, smooth, planar, tight 125.45' - Fracture, <5 deg, rough, undulating, tight	SC-14 collected at 123.10-124.4' R18: 10 minutes			
130 -86.9	R19-HQ 5 ft 88%	82	1 0 1 0 NR	126.9' - Fracture, 60 deg, rough, undulating, tight 128.5' - Fracture, horizontal, rough, stepped, open	Driller's Remark: Softer at 130.0' and below SC-15 collected at 128.6-130.15'			
135 -91.9	R20-HQ 5 ft 100%	28	3 10 6 1 10	130.9' - Fracture, horizontal, smooth, undulating, open 131.15' - Fracture, vertical, rough, planar, tight 131.5' - Fracture, <5 deg, rough, undulating, open 131.7' - Fracture, 40 deg, rough, undulating, tight 132.0-133.0' - Fracture zone 133.15, 133.18, 133.22, 133.40, 133.70, 133.80' - Fracture zone, <5 deg, rough, planar 135.22, 135.52, 135.6' - Fractures (3), horizontal, smooth, planar, tight to open	No Recovery 130.15-130.75' Limestone 130.75-131.8' - Same as 124.9-130.15' 131.8-133.35' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), no to mild HCl reaction, very weak to weak (R1 to R2), voids on 20-25% of surface, <10% cavities, trace fossils 133.35-133.5' - yellowish gray, (5Y 7/2), strong HCl reaction, weak to medium strong (R2 to R3), <2% voids, trace cavities 133.5-133.85' - Same as 133.35-133.5' except very weak (R1), laminated bedding	SC-16 collected at 133.75-134.84' R20: 6 minutes		



PROJECT NUMBER: 338884.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

WATER LEVELS : 2.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
140 -96.9	R21-HQ 5 ft 64%	40	0		Limestone 133.85-135.25' - Same as 133.35-133.5' 135.25-137.3' - Same as 131.85-133.35' 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 laminated No Recovery 137.9-139.7' Limestone 139.7-141.0' - light gray to very light gray, (N7 to N6), very fine grained, weak (R2), 2-3% voids over surface, cavities over 5-10%, voids and cavities more common with depth, cavities up to 1/16"-1/8" 141.0-142.05' - Same as 139.7-141.0' except voids up to 10-15% of surface cavities up to 3/16", cavities interconnected 142.05-142.5' - yellowish gray to light gray, (5Y 5/2 to N7), strong HCl reaction, weak to medium strong (R2 to R3) 142.5-142.6' - moderate olive brown, fine to very fine grained, extremely weak (R0) 142.6-143.5' - Same as 142.05-142.5' 143.5-144.65' - yellowish gray, (5Y 5/2), strong HCl reaction, weak (R2), voids over 15% of surface 144.65-145.05' - yellowish gray, (5Y 5/2), very fine to fine grained, mild to moderate HCl reaction, voids rare to absent 145.05-145.4' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, weak (R2), voids over 30-40% of surface, cavities over 5-10% of surface, angular to round limestone clasts of very fine grained limestone 145.4-148.1' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, very weak (R1), voids on 5-15% of surface 148.1-151.0' - Same as 145.4-148.1' except weak (R2), trace cavities up to 3/8", voids over 15-25% of surface 151.0-153.35' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild to moderate HCl reaction, medium strong to weak (R3 to R2), voids over 5-15% of surface 153.35-154.7' - fine grained, no to mild HCl reaction, very weak (R1), thinly laminated below 154.0'	SC-17 collected at 136.0-137.3'	
			3	137.3, 137.5' - Fractures (2), horizontal, rough, stepped, open 137.9' - Fracture, 50 deg, rough, stepped, open			
			NR				
			1	139.70' - Fracture, 50 deg, rough, stepped, open			
145 -101.9	R22-HQ 5 ft 100%	72	4	140.4' - Fracture, 15 deg, rough, stepped, tight		R21: 6 minutes	
			1	140.55' - Fracture, <5 deg, rough, stepped, tight 140.56' - Fracture, horizontal, rough, undulating, tight			
			>10	140.72' - Fracture, 40 deg, rough, stepped, tight			
			2	141.6' - Fracture, <5 deg, rough, stepped, tight			
			1	142.05-142.35' - Fracture zone, horizontal, rough, stepped, open 142.5' - Fracture, horizontal, rough, undulating, tight		SC-18 collected at 144.15-145.05'	
			3	142.65' - Fracture, horizontal, rough, stepped, tight 143.65' - Fracture, 0 to 20 deg, rough, planar, tight		R22: 10 minutes	
150 -106.9	R23-HQ 5 ft 100%	70	0	143.95' - Fracture, 20 deg, rough, undulating, tight		SC-19 collected at 146.0-147.3'	
			1	144.25' - Fracture, horizontal, rough, stepped, open 145.05' - Fracture, horizontal, rough, undulating, open			
			1	145.85, 145.90' - Fractures (2), 20 deg, rough, undulating, open			
			1	147.3' - Fracture, 0 to 20 deg, rough, undulating, open			
			2	148.55' - Fracture, 50 deg, rough, undulating, tight 149.9' - Fracture, 60 deg, rough, planar, tight		R23: 5 minutes	
			2	150-150.5' - Fracture, 70 deg, rough, undulating, tight			
			2	150.95' - Fracture, 0 to 90 deg, rough, undulating, tight			
			0	151.0-151.4' - Fracture, 70 deg, rough, stepped, tight			
			2	151.95' - Fracture, 50 deg, rough, undulating, tight			
155 -111.9	R24-HQ 5 ft 100%	82	3	153.75' - Fracture, horizontal, rough, planar, open		SC-20 collected at 154.7-156'	
			0	154.15' - Fracture, horizontal, smooth, undulating, open		R24: 6 minutes	
			0	154.30, 154.55' - Fractures (2), horizontal, smooth, undulating, tight			
			0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 9 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
160 -116.9	R25-HQ 5 ft 100%	74	0			154.7-156.0' - Same as 151.0-153.35' Limestone 156.0-158.03' - moderate olive brown, (5Y 4/4), fine grained, very weak to weak (R1 to R2), voids on 15-20% of surface with interlaminar zones of finer grained limestone with <5% voids, rare cavities 158.03-158.5' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), <3% voids, thinly laminated 158.5-159.4' - yellowish gray, (5Y 7/2), strong HCl reaction, medium strong (R3), <1% voids, thinly laminated	SC-21 collected at 159.5-160.3' R25: 7 minutes	
161.0			2			159.4-161.65' - light olive gray to light olive brown, (5Y 5/2 to 5Y 5/6), fine grained, very weak to weak (R1 to R2), voids on 25-30% of surface, 3/8" voids up to 3-5%, very thinly laminated		
165 -121.9	R26-HQ 5 ft 100%	8	5			160.3' - Fracture, horizontal, rough, planar, open 160.4' - Fracture, horizontal, rough, undulating, tight 161.2, 161.25' - Fractures (2), 30 deg, rough, stepped, open 161.55' - Fracture, 40 deg, rough, stepped, open 161.65' - Fracture, <5 deg, rough, undulating, open 161.9' - Fracture, horizontal, smooth, planar, open 162.6' - Fracture, horizontal, rough, undulating, open 162.75' - Fracture zone, 30 to 90 deg, rough, stepped, tight 162.9' - Fracture, <5 deg, rough, stepped, open 162.9-163.5' - Fracture zone, <5 to 90 deg, rough, undulating to stepped, open 163.5-165.1' - Fracture zone, horizontal, smooth to rough, planar, open 165.1' - Fracture, 0 to 50 deg, smooth, planar, open 165.3' - Fracture, 30 deg, smooth, stepped, tight 165.5, 165.8' - Fractures (2), 0 to 90 deg, rough, stepped, open 166.0-167.0' - Fracture zone, 0 to 40 deg, smooth to rough 167.15' - Fracture, 50 deg, rough, planar, tight 167.85' - Mechanical break 168.70' - Fracture, horizontal, rough, undulating, tight 169.7' - Fracture, horizontal, rough, undulating, open 169.7-170.1' - Fracture zone, 0 to 90 deg, rough, undulating, tight 170.1' - Fracture, <5 deg, rough, undulating, open 170.65' - Fracture, 5 deg, rough, undulating, tight 171.55' - Fracture, horizontal, rough, stepped, tight 171.85' - Fracture, 60 deg, rough, undulating, tight	R26: 6 minutes	
166.0			3			161.65-161.87' - light olive gray, (5Y 5/2), fine to very fine grained, weak (R2), voids over 5-10% of surface 161.87-162.2' - olive gray to medium olive brown, (5Y 3/2 to 5Y 4/4), fine to very fine grained, extremely weak (R0), thinly laminated 162.2-162.72' - Same as 159.4-161.65' 162.72-166.0' - yellowish gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, weak (R2), voids over 5-10% of surface 166.0-166.95' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine grained, moderate HCl reaction, very weak (R1), thin laminae of extremely weak rock (R0), voids over 5-10% of surface 166.95-168.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to very fine grained, laminated with very fine grained limestone with <1% voids, rest of rock up to 15-20% voids, rare cavities 168.5-169.9' - yellowish gray, (5Y 7/2), fine grained, very weak to weak (R1 to R2), voids over 5-10% of surface 169.9-171.0' - yellowish gray, (5Y 7/2), fine grained, weak (R2), voids over 15-25% of surface, 1/8"-3/16" cavities over 5% of surface	SC-22 collected at 168.7-169.7' R27: 8 minutes	
170 -126.9	R27-HQ 5 ft 100%	64	>10					
171.0			1					
175 -131.9	R28-HQ 5 ft 100%	74	2				R28: 8 minutes	
176.0			2					
			2					
			2					
			5					
			1					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-19	SHEET 10 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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
180 -136.9	R29-HQ 5 ft 72%	28	10	172.20' - Fracture, 50 deg, rough, undulating, tight		171.0-177.4' - yellowish gray to pale olive, (5Y 7/2 to 10Y 6/2), fine grained, moderate to strong HCl reaction, weak (R2), generally <3-5% voids, voids up to 10-15% of surface from 174.0-174.7', rare cavities up to 3/4" to 1-3/16"	End drilling on 3/24/07 at 176.0' at 17:00 hrs Water level at 2.0' below ground surface Begin coring at 176.0' on 3/25/07, continuing to have lost circulation	
			7	172.70' - Fracture, horizontal, smooth, planar, infilling, tight, brown silty infilling over 5%				
			2	173.1' - Fracture, horizontal, rough, undulating, tight				
			>10	173.3' - Fracture, <5 deg, rough, undulating, open		Limestone		
			NR	174.05' - Fracture, horizontal, rough, undulating, black stain over 5%		177.4-178.5' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, weak (R2), voids on 10% of surface, 3/4" to 1-3/16" cavities on 3-5% of surface, thin organic laminae at 177.8' inclined at 30-40 deg	R29: 8 minutes	
181.0				174.45' - Fracture, 10 deg, rough, planar, tight		178.5-179.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), voids over 5-10% of surface, cavities over 5-10% of surface, typically 3/8" long, fossiliferous		
			2	174.7' - Fracture, <5 deg, rough, stepped, open		No Recovery 179.6-181.0' Limestone	Driller's Remark: Soft at 183.0-184.0'	
			>10	174.82' - Fracture, 10 deg, smooth, planar, dark brown clay over 80%, open		181.0-183.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), voids on 3-5% of surface, some cavities up to 3/4" to 1-3/16" long		
			>10	174.87' - Fracture, 10 deg, smooth, planar, dark brown clay over 80%, open		183.0-183.5' - moderate olive brown, (5Y 4/4), fine grained, very weak (R1), voids on 5-10% of surface	R30: 8 minutes	
			>10	175.4-176.0' - Fracture, vertical, rough, undulating to stepped, tight		183.5-184.2' - yellow gray to light olive gray, (5Y 7/2 to 5Y 5/2), strong HCl reaction, weak (R2)		
			4	176.3-176.8" - Fracture, 0 to 90 deg, rough, undulating to stepped, open		184.2-185.3' - yellowish gray, moderate to strong HCl reaction, weak (R2), voids over 28-30% of surface, cavities over 5-10% of surface, fossiliferous	SC-23 collected at 187.3-188.6'	
185 -141.9	R30-HQ 5 ft 96%	14	2	177.15, 177.25, 177.3' - Fractures (3), 20 deg, smooth, planar, open		185.3-185.8' - Same as 183.5-184.2'		
			NR	177.5' - Fracture, <5 deg, rough, undulating, tight		No Recovery 185.8-186.0' Limestone		
			3	177.6' - Fracture, <5 deg, smooth, undulating, open		186.0-187.0' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, weak (R2), voids on 1-3% of surface	R31: 7 minutes	
			2	177.75, 177.85' - Fractures (2), 20 deg, rough, planar, open		187.0-187.3' - Same as 186.0-187.0' except voids increase to 15-20% with some cavity infilling and staining on vertical fractures		
			NR	178.3' - Fracture, 30 deg, rough, undulating, tight		187.3-189.2' - yellowish gray, (5Y 7/2), strong HCl reaction, weak (R2), voids over 1-3% of surface	SC-24 collected at 191.55-192.55'	
			3	178.85' - Fracture, 60 deg, rough, undulating, open		189.2-190.0' - moderate olive brown, (5Y 5/6), fine grained, no to mild HCl reaction, extremely weak to very weak (R0 to R1), voids over 40-50% of surface, irregular cavities up to 3/8"-3/4"		
			2	181.7' - Fracture, <5 deg, rough, stepped, tight				
			3	181.8' - Fracture, vertical, smooth, undulating, tight				
190 -146.9	R31-HQ 5 ft 100%	68	3	181.95' - Fracture, <5 deg, rough, stepped, tight				
			3	182.5-182.75' - Fracture zone, rough to smooth, various fracture plane orientations				
			1	182.5' - Fracture, <5 deg, rough, undulating, open				
			1	182.75' - Fracture, <5 deg, rough, undulating, open				
			3	183.0' - Fracture, <5 deg, rough, undulating, open				
			1	183.2' - Fracture, 30 deg, rough, undulating, open				
			4	183.45-183.65' - Fracture zone				
			>10	183.65-185.7' - Fracture, vertical, undulating to planar, tight				
			>10	184.2' - Fracture, horizontal, rough, planar to stepped				
			>10	184.3' - Fracture, 50 deg, rough, stepped, open				
195 -151.9	R32-HQ 5 ft 100%	40	4	184.6, 185.1' - Fracture (2), 0 to 90 deg, rough, undulating				
			>10	186.0-186.9' - Fracture, vertical, rough, stepped, tight				
			>10				R32: 9 minutes	



PROJECT NUMBER: 338884.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 on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
200 -156.9	R33-HQ 5 ft 96%	75	1	186.25' - Fracture, horizontal, smooth, planar 186.8' - Fracture, <5 deg, rough, stepped, tight		190.0-191.0' - light olive brown, (5Y 5/6), fine grained, no to mild HCl reaction, very weak (R1), voids on 25-30% of surface, small cavities on 1-3% of surface Limestone 191.0-193.5' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong HCl reaction, weak (R2), trace cavities up to 3/8"-3/4" in length, voids on 10-15% of surface 193.5-193.65' - light olive brown, (5Y 5/6), moderate HCl reaction, very weak (R1), voids over 1-5% of surface, thinly laminated at base, trace organics 193.65-195.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids over 1-5% of surface 195.0-196.0' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, very weak (R1), voids on 1-5% of surface 196.0-196.9' - yellowish gray, (5Y 7/2), fine grained, mild to strong HCl reaction, very weak (R1), voids on 15-20% of surface, cavities over 10% 196.9-197.8' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids over 1-5% of surface, cavities rare 197.8-199.4' - Same as 196.0-196.9' 199.4-200.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, strong HCl reaction, very weak (R1), voids over 5-10% of surface, trace cavities 200.2-200.8' - yellowish gray, very fine grained, very weak to weak (R1 to R2), voids on 1-3% of surface, cavities over 10-15% up to 3/4"-1-3/16" length, abundant hair-line fractures No Recovery 200.8-201.0' Limestone 201.0-202.5' - Same as 200.2-200.8' 202.5-203.0' - light olive gray, (5Y 5/2), fine grained, very weak (R1), voids on 1-3% of surface, laminated organics in lower section	SC-25 collected at 196.0-196.9'	
			0	187.3, 187.4, 187.55' - Fractures (3), 50 deg, rough, undulating, tight 188.6' - Fracture, <5 deg, smooth, undulating, open				
			0	188.7' - Fracture, <5 to 90 deg, rough, stepped, open				
			3	189.35' - Fracture, horizontal, rough, planar, open, black organics over 95% 189.5' - Fracture, horizontal, rough, undulating, open				
			4	189.95, 190.0' - Fractures (2), horizontal, rough, planar, open			R33: 9 minutes	
201.0			NR	191.1' - Fracture, 50 deg, rough, undulating, open				
			4	191.25' - Fracture, <5 deg, rough, undulating, open				
			4	191.5' - Fracture, 50 deg, rough, stepped, tight				
			2	192.55' - Fracture, 40 deg, rough, undulating, tight				
205 -161.9	R34-HQ 5 ft 98%	52	2	193.55, 193.65' - Fractures (2), <5 deg, rough, undulating, open				
			2	193.8' - Fracture, 40 deg, smooth, undulating, open				
			0	193.95-196.0' - Fracture zone, various orientations, rough, open			R34: 10 minutes	
			NR	196.9' - Fracture, <5 deg, rough, stepped				
			2	199.74' - Fracture, horizontal, rough, stepped, open				
			4	199.8' - Fracture, horizontal, rough, undulating, open		SC-26 collected at 206.6-207.65'		
			4	199.95, 200.03' - Fractures (2), horizontal, rough, stepped, open				
			4	200.20' - Fracture, 20 deg, smooth, undulating, open				
			10	200.5, 200.65' - Fractures (2), horizontal, rough, stepped, open				
210 -166.9	R35-HQ 5 ft 100%	42	>10	201.05' - Fracture, <5 deg, rough, stepped, open				
			>10	201.3' - Fracture, 0 to 90 deg, rough, undulating, open		R35: 9 minutes		
			10	201.4, 201.5' - Fractures (2), <5 deg, rough, undulating, open				
			>10	202.2-202.35' - Fractures (2), 50 deg, rough, planar, tight				
			10	202.75-203.1' - Fracture zone, 50 to 60 deg, rough, planar, tight				
			>10	203.85, 204.55' - Fractures (2), <5 deg, rough, undulating, tight				
			NR	204.8-205.5' - Fracture zone, 50 to 60 deg, rough, undulating, open				
			NR	206.25, 206.6' - Fractures (2), <5 deg, rough, undulating, tight				
215 -171.9	R36-HQ 5 ft 46%	14	NR	207.65, 207.85' - Fractures (2), <5 deg, smooth, planar, open, organic material over 30%				
			NR	207.94' - Fracture, horizontal, rough, undulating, open		R36: 10 minutes		



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 : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS							
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION											
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS											
220 -176.9	R37-HQ 5 ft 37%	0	4	207.98, 208.1' - Fractures (2), horizontal, smooth, planar, organic material over 40%		203.0-205.9' - yellowish gray to light olive yellow, (5Y 7/2 to 5Y 5/2), very fine grained, mild to moderate HCl reaction, weak (R2), voids over 40-50% of surface, cavities up to 1-3/16"-1-9/16" penetrating into core, some recrystallization infilling with very fine grained limestone in cavities, trace fossil casts No Recovery 205.9-206.0' Limestone 206.0-207.65' - Same as 203.0-205.9' Limestone 207.65-209.75' - yellowish gray, (5Y 5/2), very fine grained, very weak (R1), voids over 10-15% of surface, trace cavities (up to 3/8"x3/16") ellipsoidal in shape 209.75-212.0' - light olive gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), voids on 20-30% of surface 212.0-213.3' - very fine grained, mild to moderate HCl reaction, voids on 15-20% of surface, 10-15% cavities up to 3/4" to 1-3/16" in length No Recovery 213.3-216.0' Limestone 216.0-216.8' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak (R2), fossiliferous, laminated with black organic material, voids over 20% of surface, cavities up to 3/8" on 5% of surface 216.8-216.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2) 216.9-217.85' - Same as 216.8-216.9' except color is lighter No Recovery 217.85-221.0' Limestone 221.0-222.3' - yellowish gray, (5Y 7/2), fine to very fine grained, very weak (R1), rounded to subrounded rock fragments, voids on 5-10% of surface, 3/4"-3/16" cavities on 10% of surface 222.3-223.4' - yellowish gray, (5Y 7/2), very fine grained, mild to moderate HCl reaction, very weak (R1) 223.4-223.5' - Same as 221.0-222.3' 223.5-224.8' - pale gray, (5Y 6/2), fine grained, mild HCl reaction, very weak (R1), fossiliferous, voids on 20-25% of surface, cavities (<3/8") over 1-3% of surface No Recovery 224.8-226.0'	R37: 8 minutes								
225 -181.9	R38-HQ 5 ft 76%	21	>10	208.13' - Fracture, 40 deg, smooth, planar, open				208.4-208.55' - Fracture, rock has semi-circular fracture pattern, discontinuous, unbroken fracture plane 208.55' - Fracture, 10 deg, smooth, planar, tight 208.80' - Fracture, horizontal 209.05' - Fracture, horizontal, smooth, planar, open 209.20' - Fracture, <5 deg, rough, undulating, open 209.85-211.0' - Fracture zone, numerous fractures of different orientations 211.0-212.05' - Fracture zone, numerous fractures of different orientations 212.75, 212.9' - Fractures (2), 10 deg, rough, planar, tight 212.9-212.15' - Fracture zone, various orientations 216.0-216.2' - Fracture zone, horizontal, rough, planar, open 216.55' - Fracture, <5 deg, rough, undulating, open 216.75' - Fracture 216.9' - Fracture, horizontal, smooth, undulating, open 217.05-217.3' - Fracture zone, horizontal, smooth, planar, open 217.3' - Fracture, horizontal, rough, planar, open 217.57-217.8' - Fracture zone, rough, planar, various orientations 221.0' - Fracture, horizontal, rough, undulating, open 221.6-222.05' - Fracture zone, horizontal, rough, undulating, open 221.7-222.0' - Fracture zone 222.3' - Fracture, horizontal, rough, stepped, open 222.5' - Fracture zone, 20 deg, rough, undulating, open 222.7-223.6' - Fracture zone 224.05, 224.3' - Fractures (2), 60 to 70 deg, rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating, open 226.4' - Fracture, <5 deg, rough, undulating, open 226.4-226.65' - Fracture zone, rough, undulating, gravel-sized limestone fragments, open 226.5' - Fracture, horizontal, rough, undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough, stepped, open 231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments, black coating on fragments from 231.0-231.2'	R38: 8 minutes						
230 -186.9	R39-HQ 5 ft 56%	0	10	212.9-212.15' - Fracture zone, various orientations						216.0-216.8' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak (R2), fossiliferous, laminated with black organic material, voids over 20% of surface, cavities up to 3/8" on 5% of surface 216.8-216.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2) 216.9-217.85' - Same as 216.8-216.9' except color is lighter No Recovery 217.85-221.0' Limestone 221.0-222.3' - yellowish gray, (5Y 7/2), fine to very fine grained, very weak (R1), rounded to subrounded rock fragments, voids on 5-10% of surface, 3/4"-3/16" cavities on 10% of surface 222.3-223.4' - yellowish gray, (5Y 7/2), very fine grained, mild to moderate HCl reaction, very weak (R1) 223.4-223.5' - Same as 221.0-222.3' 223.5-224.8' - pale gray, (5Y 6/2), fine grained, mild HCl reaction, very weak (R1), fossiliferous, voids on 20-25% of surface, cavities (<3/8") over 1-3% of surface No Recovery 224.8-226.0'	R39: 10 minutes				
235 -191.9	R40-HQ 5 ft 64%	9	>10	216.0-216.2' - Fracture zone, horizontal, rough, planar, open								222.5' - Fracture zone, 20 deg, rough, undulating, open 222.7-223.6' - Fracture zone 224.05, 224.3' - Fractures (2), 60 to 70 deg, rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating, open 226.4' - Fracture, <5 deg, rough, undulating, open 226.4-226.65' - Fracture zone, rough, undulating, gravel-sized limestone fragments, open 226.5' - Fracture, horizontal, rough, undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough, stepped, open 231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments, black coating on fragments from 231.0-231.2'	R40: 9 minutes		
236.0			NR	216.75' - Fracture										222.5' - Fracture zone, 20 deg, rough, undulating, open 222.7-223.6' - Fracture zone 224.05, 224.3' - Fractures (2), 60 to 70 deg, rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating, open 226.4' - Fracture, <5 deg, rough, undulating, open 226.4-226.65' - Fracture zone, rough, undulating, gravel-sized limestone fragments, open 226.5' - Fracture, horizontal, rough, undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough, stepped, open 231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments, black coating on fragments from 231.0-231.2'	222.5' - Fracture zone, 20 deg, rough, undulating, open 222.7-223.6' - Fracture zone 224.05, 224.3' - Fractures (2), 60 to 70 deg, rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating, open 226.4' - Fracture, <5 deg, rough, undulating, open 226.4-226.65' - Fracture zone, rough, undulating, gravel-sized limestone fragments, open 226.5' - Fracture, horizontal, rough, undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough, stepped, open 231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments, black coating on fragments from 231.0-231.2'



PROJECT NUMBER: 338884.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 on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
240 -196.9	R41-HQ 5 ft 30%	0	NR	>10 >10 232.4-232.8' - Fracture, vertical, rough, undulating, tight 233.0-233.6' - Fracture zone, various orientations 233.7' - Fracture, 0 to 90 deg, smooth, planar, open 234.2' - Fracture, horizontal, rough, undulating, open 236.0-236.75' - Fracture zone, 0 to <5 deg, rough, stepped to undulating, open, distinct fracture planes at 236.12', 236.4', 236.75' 237.0-237.5' - Fracture zone, gravel-sized rock fragments	Limestone 226.0-228.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, very weak (R1), voids over 5-10% of surface, concentrated to 20-30% of surface in thin (1") beds, trace organics, cavities up to 3/4"-1-3/16" present at 226.0-226.7' No Recovery 228.8-231.0' Limestone 231.0-231.8' - light olive brown, (5Y 5/6), fine grained, very weak (R1), voids over 15-20% of surface Limestone 231.8-233.5' - yellowish gray, (5Y 7/2), very fine grained, very weak (R1), gravel-sized limestone fragments, trace voids 233.5-234.2' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to mild HCl reaction, very weak (R1), trace to 10% voids increasing with depth, some organic staining at 234.1' No Recovery 234.2-236.0' Limestone 236.0-236.75' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, very weak (R1), sandy texture with inclined fracture traces 236.75-237.5' - Same as 233.5-234.2' No Recovery 237.5-241.0' Limestone 241.0-243.0' - yellowish gray, (5Y 7/2), very fine to fine grained, no to mild HCl reaction, limestone fragments, voids and cavities present on some surfaces No Recovery 243.0-246.0' Limestone 246.0-248.3' - fine to very fine grained, mild HCl reaction, extremely weak to weak (R0 to R2), voids over 30-40% of surface to 247.8', 0-5% of surface on 247.8-248.3' No Recovery 248.3-251.0' No Recovery 251.0-256.0'	R41: 8 minutes	
245 -201.9	R42-HQ 5 ft 40%	0	NR	>10 >10 241.0-243.0' - Fracture, 0-90 deg, rough, planar, open	Limestone 246.0-247.0' - Fracture zone 247.1' - Fracture, horizontal, smooth, planar, open 247.4' - Fracture, 80 deg, rough, stepped, open 247.6' - Fracture, horizontal, rough, undulating to stepped, open 248.05, 248.25, 248.35' - Fracture (3), horizontal, rough, undulating, open	R42: 9 minutes	
250 -206.9	R43-HQ 5 ft 46%	0	NR	>10 10 3 NR	246.0-247.0' - Fracture zone 247.1' - Fracture, horizontal, smooth, planar, open 247.4' - Fracture, 80 deg, rough, stepped, open 247.6' - Fracture, horizontal, rough, undulating to stepped, open 248.05, 248.25, 248.35' - Fracture (3), horizontal, rough, undulating, open	R43: 9 minutes	
255 -211.9	R44-HQ 5 ft 0%	0	NR	NR	251.0-256.0' - Fracture zone, gravel-sized rock fragments	R44: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/26/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -216.9	R45-HQ 5 ft 20%	0	>10	[Symbolic Log: Fractured Limestone]	Limestone 256.0-257.0' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl reaction, extremely weak to very weak (R0 to R1), poorly fossiliferous, some organic staining No Recovery 257.0-261.0'	R45: 13 minutes	
261.0		NR	256.0-257.0, 261.0-261.5' - Fracture zone, various orientations, gravel-sized rock fragments				
265 -221.9	R46-HQ 5 ft 10%	0	>10	[Symbolic Log: Fractured Limestone]	Limestone 261.0-261.5' - Same as 256.0-257.0' No Recovery 261.5-266.0'	R46: 9 minutes	
266.0		NR					
					Bottom of Boring at 266.0 ft bgs on 3/26/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.3	0.0	1.6	SS-1	Poorly Graded Sand With Organics (SP) 0.0-1.0' - light gray, (N6), moist, loose, very fine to fine grained, up to 30% fine organics, trace nonplastic fines, grades to silty sand below		
	2.0			Silty Sand (SM) 1.0-1.6' - grayish brown, (5YR 3/2), moist, loose, fine grained, 20% nonplastic fines, fines may be organics		
		1.0	SS-2	Silty Sand (SM) 2.0-3.0' - Same as 1.0-2.0' except moderate yellowish brown, (10YR 5/4), wet, medium dense, trace roots		
5	4.0			Poorly Graded Sand With Silt (SP-SM) 4.0-6.0' - pale yellowish brown, (10YR 6/2), wet, very loose, fine grained, 8% low plastic fines, grades to dusky brown (5YR 3/2)		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)
37.3	6.0	2.0	SS-3			Driller's Remark: Spoon fell through 3rd 6 inches
	8.0	0.4	SS-4	Silty Sand (SM) 6.0-6.4' - Same as 4.0-6.0' except 10% nonplastic fines		Driller's Remark: Spoon fell through entire 2' interval
	10.0	1.4	SS-5	Lean Clay With Sand (CL) 8.0-8.8' - yellowish gray, (5Y 8/1), wet, medium stiff, moderate plasticity, 29% fine to coarse sand and fine to coarse gravel, lens of light bluish gray (5B 7/1), fat clay (CH), no HCl reaction in CH.		
10	12.0	1.6	SS-6	Silt (ML) 8.8-9.4' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand, all carbonate		
32.3	12.8			Silt (ML) 10.0-11.6' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand, all carbonate		
	13.4	1.3	SS-7	Silt (ML) 12.0-13.3' - Same as 10.0-11.6'		
	14.0					
15	15.7	1.7	SS-8	Silt (ML) 14.0-15.7' - Same as 12.0-13.3' except trace sand		
27.3	16.0					
	18.0	1.7	SS-9	Silt With Sand (ML) 16.0-17.7' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% very fine to fine sand-sized, 5% medium to coarse sand, all carbonate.		
		2.0	SS-10	Silt With Sand (ML) 18.0-20.0' - Same as 16.0-17.7' except moist		
20						



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
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6"-6" (N)			
22.3	20.0	1.9	SS-11	30-37-33-50 (70)	Silt With Sand (ML) 20.0-21.9' - Same as 18.0-20.0' except lenses of coarse sand at 20.7 and 21.7', all carbonate		
	22.0	1.7	SS-12	42-48-38-45 (86)	Silt With Sand (ML) 22.0-23.7' - grayish orange, (10YR 7/4), moist, hard, nonplastic, very rapid dilatancy, moderate HCl reaction, 10% to 20% fine to medium sand, carbonate		
	24.0	0.5	SS-13	50/5" (50/5")	Sandy Silt To Silt With Sand (ML) 24.0-24.4' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, up to 25-30% fine to medium sand-sized grains decreasing with depth to 10-15%, all carbonate		
25 17.3	24.5						
	26.0	1.4	SS-14	43-44-50/3" (94/9")	Silt With Sand (ML) 26.0-27.3' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, moderate HCl reaction, 20-25% fine to coarse sand, trace white carbonate clay in stringers <1/16" thick		
	27.4						
	28.0	1.8	SS-15	16-30-32-33 (62)	Silt With Sand (ML) 28.0-29.8' - Same as 26.0-27.4' except 20% sand		
30 12.3	30.0	1.6	SS-16	11-14-28-50 (42)	Silt With Sand (ML) 30.0-31.6' - Same as 28.0-29.8'		
	32.0	0.2	SS-17	50/2" (50/2")	Silt (ML) 32.0-32.1' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% fine to medium sand, 5-10% white carbonate clay stringers <1/16" thick		Driller's Remark: Some drill chatter 32.0-34.0'
	32.2						
	34.9	0.0	SS-18	50/0" (50/0")	Organic Soil (OL) 32.1-32.2' - grayish brown, (5YR 3/2), moist to wet, firm, low to medium plasticity, no to mild HCl reaction, trace white stringers No Recovery 34.0' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		Apparent top of rock at 34' End of soil boring on 4/24/07 at 16:30, will continue hole with rock coring 34.0-35.0' interval drilled through to set stroke
35 7.3							
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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
7.3	35.0	77	1	35.4' - Fracture, horizontal, rough, undulating	Limestone 35.0-39.7' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, medium strong (R3), small voids (1/16") over 20% of surface, few cavities up to 3/8", moderately fossiliferous No Recovery 39.7-40.0' Silt (ML) 40.0-43.2' - dusky yellow, (5Y 6/4), wet, high dilatancy, fine sand up to 15%, very weakly indurated 40.8-41.2' No Recovery 43.2-45.0'	Rock coring begins at 35' below ground surface, continuing after soil boring from surface to 34' Water level at 07:35 hrs on 4/25/07 R1: 9 minutes	
			1	36.2' - Fracture, 20 deg, rough, undulating, thin (1/16") infill of carbonate derived silt			
			3	37.2' - Mechanical break, horizontal, rough, undulating, open up to 3/4"			
			0	37.5' - Fracture, 50 deg, rough, undulating, black staining on faces, open 1/4-1/2", fossil cast on surface			
			0	37.85' - Fracture, 10 deg, rough, undulating, fossil casts on surface, tight			
40 2.3	40.0	0	NR				
			NA				
		22	4	45.1, 45.2, 45.4' - Fractures or mechanical break (3), horizontal, rough, undulating, open 1/4" to 1/2"	Limestone 45.0-49.2' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, extremely weak (R0), trace organics from 48.0-49.0' No Recovery 49.2-50.0'	Layers up to few inches thick of apparently non indurated material at 48.0-48.9' R3: 4 minutes	
			4	45.9' - Mechanical break			
			3	46.15' - Mechanical break			
			1	46.4' - Fracture, 15 deg, rough, undulating, 1/16" of carbonate derived silt infilling			
			0	46.6' - Fracture, horizontal, rough, undulating, 1/16" of carbonate derived silt infilling			
		22	1	46.7' - Mechanical break	Limestone 50.0-51.7' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, very weak (R1), trace organics, small voids (1/16") over 20% of surface, few larger (3/16"x3/8") cavities (molds/casts) No Recovery 51.7-55.0'	R4: 7 minutes	
			0	47.2' - Mechanical break			
			0	47.7' - Mechanical break			
			NR	47.95' - Mechanical break			
50 -7.7	50.0	22	2	50.5' - Fracture, 10-70 deg, rough, undulating, multiple fragments up to 1", 1/2-3" open			
			NR	50.95' - Fracture, horizontal, rough, undulating, open up to 1"			
55	55.0						



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
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-12.7	R5-HQ 5 ft 94%	60	1	55.8' - Mechanical break	Limestone 55.0-57.7' - Same as 50.0-51.7' 57.7-59.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), small (1/16") voids over about 30% of surface, few larger (up to 3/16") voids and fossil molds Silty Sand (SM) 59.4-59.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, carbonate derived No Recovery 59.7-60.0' Limestone 60.0-60.5' - Same as 55.0-57.7' except no organics 60.5-62.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), small (1/16") voids over up to 15% of surface 62.0-62.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, extremely weak (R0) 62.8-63.4' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong (R3), small (<1/16") voids over about 10% of surface 63.4-63.9' - Same as 62.0-62.8' Sand With Silt (SP-SM) 63.9-64.2' - yellowish gray, (5Y 7/2), fine grained, carbonate derived No Recovery 64.2-65.0' Limestone 65.0-66.9' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), small (<1/16") voids cover about 25% of surface, few larger voids or cavities except in zones from 65.7-65.9' and 66.7-66.9' (about 10% coverage, voids up to 1/16" diameter), moderately fossiliferous, trace organics 66.9-67.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), trace organics 67.4-69.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very fossiliferous, voids (fossil molds) up to 3/8" over about 30% of core surface No Recovery 69.5-70.0'	SC-1 collected at 55.0-55.8'	
			1	56.5' - Mechanical break, for special core		R5: 5 minutes	
			3	57.5, 57.7' - Fractures (2), horizontal, rough, undulating, organic material on faces, open up to 1/2"			
			3	57.7-58.0' - Fracture, vertical, rough, undulating, tight			
			>10	58.3' - Mechanical break			
			NR	58.8-59.5' - Fracture, vertical, rough, undulating, tight			
60 -17.7	R6-HQ 5 ft 84%	57	3	58.8-59.3' - Fracture, 75 deg, rough, undulating, open to 1/4"	SC-2 collected at 60.9-61.95' R6: 5 minutes SC-3 collected at 68.1-69.4' R7: 8 minutes		
			1	60.1' - Fracture, horizontal, smooth, undulating, open to 1/4"			
			1	60.35' - Mechanical break			
			1	60.9' - Fracture, 45 deg, rough, undulating, tight			
			2	61.95' - Fracture, 5 deg, smooth, undulating, open up to 1/4"			
			>10	62.4' - Fracture, horizontal, rough, undulating, carbonate derived silt infill about 0.1" thick			
65 -22.7	R7-HQ 5 ft 90%	58	>10	63.0, 63.6' - Fractures (2), horizontal, rough, undulating, open up to 1/2"			
			3	65.3-65.7' - Fracture zone, fragments up to 2"			
			1	65.7-66.15' - Mechanical break, vertical, rough, undulating, tight			
			1	66.15' - Mechanical break, 15 deg, rough, undulating, open up to 1/2"			
			1	66.5-66.95' - Mechanical break, 25 deg, rough, undulating			
			1	66.95' - Fracture, smooth, undulating, open up to 1/2"			
70 -27.7	R8-HQ 5 ft 100%	92	0	67.4' - Fracture, horizontal, rough, undulating, open up to 1/2"	R8: 7 minutes		
			1	68.1' - Mechanical break			
			1	71.9' - Mechanical break			
			1	72.5' - Mechanical break, horizontal, smooth, undulating, along bedding plane, tight, organic material on faces			
			1	73.2' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt on faces			
75							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-32.7	R9-HQ 5 ft 84%	48	2	74.6' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt on faces	[Symbolic Log]	Limestone 70.0-72.5' - yellowish gray with some light olive gray mottling, (5Y 7/2 with 5Y 5/2), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), small (<1/16") voids cover about 20% of surface, but not uniformly, few larger (3/16") voids, trace organics 72.5-75.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, very weak (R1), trace organics, voids up to 3/8" x 1-3/16" at 72.6 and 74.0', trace clasts (3/16") of gray limestone. Slightly harder zones from 73.6-74.2' and 74.7-75.0', with small (<1/16") 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 larger (3/16") voids 78.2-79.2' - light olive gray, (5Y 5/2), moderate HCl reaction, extremely weak (R0), mixed with carbonate derived fine sand and silt No Recovery 79.2-80.0'	R9: 8 minutes	
80			2	75.0-75.3' - Fracture zone, multiple fragments, possible mechanical break				
-37.7			1	76.3-75.5' - Fracture, 70 deg, rough, undulating, possible mechanical break				
80.0			>10	76.3-76.5' - Fracture zone, multiple fragments				
85			>10	76.9' - Fracture, horizontal, rough, undulating, tight				
-42.7	R10-HQ 5 ft 90%	43	>10	77.4-77.8' - Fracture, 65 deg, rough, undulating, coating of carbonate derived silt	[Symbolic Log]	80.0-82.7' - Fracture zone, multiple fragments, up to 1-1/2" 81.8-82.7' - Fracture zone (2), multiple fragments, up to 2" 82.9-83.4' - Fracture, vertical, tight	SC-4 collected at 80.7-81.8' R10: 6 minutes	
85			NR	80.0-80.7' - Fracture zone, multiple fragments, up to 1-1/2"				
-47.7			>10	80.0-80.7' - Fracture zone, multiple fragments, up to 1-1/2"				
90			0	81.8-82.7' - Fracture zone (2), multiple fragments, up to 2"				
95			0	82.9-83.4' - Fracture, vertical, tight				
95.0	R11-HQ 5 ft 100%	70	3	85.5' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt	[Symbolic Log]	80.0-82.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), small (<1/16") voids cover about 50% of core surface. 82.8-84.5' - moderate olive brown, (5Y 4/4), moderate HCl reaction, weak (R2), fine grained, small (<1/16") voids cover about 25% of core surface, few larger (3/16") voids, trace organics No Recovery 84.5-85.0'	SC-5 collected at 87.8-89.1' R11: 8 minutes	
90			0	85.7' - Fracture, 45 deg, rough, undulating, open up to 1/2"				
-47.7			1	86.0' - Fracture, horizontal, rough, undulating, open up to 1/2"				
90.0			0	87.4' - Mechanical break				
95			>10	87.8' - Mechanical break				
95.0	R12-HQ 5 ft 62%	10	>10	89.1-90.0' - Fracture zone, multiple fragments up to 3"	[Symbolic Log]	Limestone 85.0-90.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong (R3), very fossiliferous, trace organics, small (<1/16") voids cover about 25% of surface, larger (3/8") cavities cover 30% of surface from 85.5 to 86.4 but <5% elsewhere, most larger voids are fossil molds 90.0-93.1' - Same as 85.0-90.0' except weak to medium strong (R2 to R3), moderately fossiliferous, few larger cavities, zone of light olive gray (5Y 7/2) from 91.3-91.75 No Recovery 93.1-95.0'	R12: 7 minutes	
90			>10	90.3-91.3' - Fracture zone, multiple fragments up to 2", most are 1/2-3/4", some fragments with organic material and coating of brown silt and fine sand				
-47.7			>10	91.75-93.1' - Fracture zone				
90.0			>10					
95			NR					



PROJECT NUMBER: 338884.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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-52.7	R13-HQ 5 ft 98%	58	>10	95-95.9' - Fracture zone	[Symbolic Log]	Limestone 95.0-95.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), includes small (<3/16") clasts of yellowish gray (5Y 7/2) material, small (<1/16") voids cover 10% of surface 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% of surface, concentrated in 1" wide zones, fossil casts and molds moderately abundant, laminated bedding from 97.7-99.5' 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 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 organics 100.9-104.7' - light olive gray, (5Y 5/2), fine grained, medium strong (R3), small (1/16") voids over 30% of 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' 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' 110.0-114.8' - Same as 100.9-104.7' except fewer fossils and fewer cavities larger than 3/16"	R13: 10 minutes
100			2	95.9-96.3' - Fracture, vertical, rough, undulating, open up to 1/4"			
-57.7			0	96.6' - Fracture, horizontal, rough, undulating, multiple fragments			
100.0			2	97.5' - Mechanical break			
105			2	98.1, 98.5' - Fractures (2), 65 deg, rough, undulating, tight			
-62.7			NR	99.1-99.7' - Fracture, 60 deg, rough, undulating, tight			
105.0	R14-HQ 5 ft 94%	53	3	99.2' - Fracture, 60 deg, rough, undulating, tight	[Symbolic Log]	SC-6 collected at 101.35-102.5' R14: 6 minutes	
110			0	100.2' - Fracture, horizontal, smooth, undulating, open to 1/2", black staining on surface (70%)			
-67.7			1	100.7-100.9' - Fracture zone			
110.0			1	100.35' - Mechanical break			
115			1	102.5' - Mechanical break			
115.0			1	103.0-104.0' - Fracture, 70 deg, rough, undulating			
	R15-HQ 5 ft 100%	93	NR	104.0-104.7' - Fracture, vertical, rough, undulating	[Symbolic Log]	SC-7 collected at 108.85-110.0' R15: 8 minutes	
			1	105.9' - Mechanical break			
			2	106.6' - Fracture, 45 deg, rough, undulating, open up to 1/8"			
			2	107.0-107.3' - Fracture zone, multiple fragments, up to 1-1/2"			
			0	107.85' - Fracture, 45 deg, rough, undulating, open up to 1/8"			
			0	108.15' - Fracture, 20 deg, rough, undulating, tight			
	R16-HQ 5 ft 96%	82	1	108.6' - Fracture, 40 deg, rough, undulating, tight	[Symbolic Log]	SC-8 collected at 113.65-114.5' R16: 8 minutes	
			0	111.8-112.1' - Fracture, 45 deg, rough, undulating, dark staining on 5% of surface, open <1/8"			
			2	112.1-112.6' - Fracture, 65 deg, open up to 1/4"			
			1	112.5-112.7' - Fracture, 45 deg, tight			
			0	113.25-113.45' - Fracture, 55 deg, tight			
			0	113.65, 114.5' - Mechanical break (2)			



PROJECT NUMBER: 338884.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
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-72.7	R17-HQ 5 ft 78%	NR	NA	0	115.5-116.3' - Fracture zone	No Recovery 114.8-115.0' Silty Sand (SM) 115.0-115.5' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, carbonate derived Limestone 115.5-118.2' - yellowish gray, (5Y 7/2), moderate HCl reaction, medium strong (R3), fine grained, moderately fossiliferous, (casts and molds), small (<1/16") voids cover about 20% of core surface, several large (3/8"x3/4") voids below 117.5' Silty Sand (SM) 118.2-118.9' - Same as 115.0-115.5' No Recovery 118.9-120.0' Limestone 120.0-124.6' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), moderately fossiliferous, particularly from 120.0-121.0, small (1/16") voids over 25% of surface, larger (3/8"x3/4") voids (fossil molds) 5-10% of surface from 120.0-121.0' 124.6-124.8' - Same as 120.0-124.6' except medium strong (R3), 3/16" fossil molds/casts on 5% of surface, small (<1/16") voids on 10% of surface No Recovery 124.8-125.0' Limestone 125.0-129.3' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong to strong (R3 to R4), laminated bedding with areas of few small voids and light gray (N7) color to 126.5, zone of larger (3/8") cavities from 127.4-127.8 No Recovery 129.3-130.0' Limestone 130.0-133.0' - Same as 124.6-124.8' except very fossiliferous below 131.0' 133.0-134.2' - light olive gray, (5Y 5/2), moderate HCl reaction, very weak (R1), small (1/16") voids over 50% surface, larger (up to 3/8") over <5% of surface	R17: 7 minutes	
		1			116.25-116.5' - Fracture, 65 deg, rough, undulating, open			
		1			117.5' - Mechanical break 117.7' - Mechanical break			
		NA						
		NR						
120	R18-HQ 5 ft 96%	1			120.8' - Fracture, horizontal, rough, undulating, open up to 1/2"	SC-9 collected at 122.8-123.9'		
-77.7		0						
		2			122.4' - Mechanical break 122.65' - Fracture, horizontal, smooth, planar, open up to 1/4", coating of carbonate derived sandy silt			
		1			122.8' - Fracture, 45 deg, rough, undulating, open up to 1/8", coating of carbonate derived sandy silt			
		1			123.9' - Fracture, 30 deg, rough, undulating, open up to 1/2"			
125	R19-HQ 5 ft 86%	NR	2		124.2' - Fracture, horizontal, rough, undulating, open up to 1/4"	SC10 collected at 127.7-128.6'		
-82.7			3		125.1-125.4, 125.2-125.4' - Fractures (2), 60 deg, rough, undulating, tight			
			1		126.45, 126.6' - Fractures (2), horizontal, smooth, undulating, coating of carbonate derived silt on faces, open up to 1/8"			
			2		126.9' - Mechanical break 127.7' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt on faces			
			0		128.6' - Fracture, 45 deg, rough, undulating, open up to 1/8"			
			NR		128.7' - Fracture, horizontal, smooth, undulating, open up to 1/4"			
			2		130.4' - Mechanical break			
130	R20-HQ 5 ft 94%	1			131.0' - Fracture, horizontal, rough, undulating, open to 1/4"	R19: 7 minutes		
-87.7					131.65' - Fracture or mechanical break, 35 deg, rough, undulating			
			>10		131.8-132.8' - Fracture zone, multiple fragments			
			3		131.1, 133.6' - Fractures (2), horizontal, smooth, planar, coating of carbonate derived silt, open to 1/4"			
			4		133.9' - Fracture, 15 deg, rough, undulating, coating of silt, open			
135		NR				R20: 7 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-20	SHEET 8 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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-92.7	R21-HQ 5 ft 98%	40	4	134.2, 134.5, 134.6' - Fractures (3), smooth, planar, along bedding planes, coating of silt	[Symbolic Log]	Limestone 134.2-134.7' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild to moderate HCl reaction, thinly laminated bedding. Yellowish gray areas are very weak rock (R1) with small (<1/16") voids over 30% of area. Olive gray areas have no small voids, medium strong rock (R3). Cavities up to 3/8"x1-3/16" are along bedding planes. No Recovery 134.7-135.0' Limestone 135.0-139.2' - Same as 133.0-134.2' except with thinly laminated bedding from 135.0-136.1' and predominantly the stronger light olive gray rock 139.2-139.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, very weak (R1), small (<1/16") voids over about 25% surface larger (3/16") voids over 5% of surface No Recovery 139.9-140.0' Silt (ML) 140.0-140.5' - light olive gray, (5Y 5/2), carbonate derived Limestone 140.5-141.1' - yellowish gray and medium light gray, (5Y 7/2 and N6), fine grained, strong HCl reaction, medium strong to strong (R3 to R4), very fossiliferous. 141.1-144.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), very fossiliferous No Recovery 144.0-145.0' Limestone 145.0-146.0' - yellowish gray, (5Y 7/2), strong HCl reaction, weak to medium strong (R2 to R3), few small (1/16") voids, poorly fossiliferous 146.0-147.05' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), moderately fossiliferous, small (<1/16") voids cover about 10% of core, few larger (3/16") voids, laminated bedding at about 146.5' 147.05-148.2' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, small (1/16") voids over 40% of surface No Recovery 148.2-150.0' Limestone 150.0-151.8' - Same as 147.05-148.2' except gradual contact at bottom	SC-11 collected at 137.4-138.45' R21: 8 minutes Driller's Remark: Loss of circulation at 141' R22: 9 minutes SC-12 collected at 147.1-148.2' R23: 6 minutes R24: 8 minutes	
			>10	136.1-137.0' - Fracture zone, horizontal, smooth to rough, open up to 1/4"				
			0	137.0, 137.4, 138.45' - Mechanical break (3)				
			1	138.7-139.2' - Fracture, 60 deg, rough, undulating, tight				
			1	139.3' - Fracture, horizontal, rough, undulating, coating of carbonate-derived silt, open up to 1/2"				
140	R22-HQ 5 ft 80%	25	NR	141.3-142.7' - Fracture zone, fragments up to 2"				
-97.7			0					
			>10					
			>10					
			>10					
145	R23-HQ 5 ft 64%	42	3	146.0' - Fracture, horizontal, rough, undulating				
-102.7			3	146.1' - Fracture, 10 deg, rough, planar, black staining on surface				
			1	146.15' - Fracture, 65 deg, rough, undulating, dark staining on surface				
			0	146.5, 146.63' - Fractures (2), smooth, planar, dark staining on surface				
			NR	147.05' - Fracture, horizontal, rough, undulating, possible mechanical break				
150	R24-HQ 5 ft 94%	70	2	150.35' - Fracture, horizontal, rough, planar, open up to 1/4"				
-107.7			2	150.85' - Fracture, 15 deg, rough, planar, tight				
			1	151.3-152.1' - Fracture, 60-40 deg, rough, undulating, open up to 1/8"				
			1	151.6' - Fracture, horizontal, rough, undulating, open up to 1/8"				
			0	152.95' - Fracture, 45 deg, rough, undulating, tight				
155	155.0	NR	>10	154.0-154.7' - Fracture zone, multiple fragments up to 1-1/2"				
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-20	SHEET 9 OF 14
ROCK CORE LOG		

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 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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-112.7	R25-HQ 5 ft 92%	58	5	155.1, 155.4, 155.5, 155.6' - Fractures (4), smooth, planar, staining present on faces at 155.4' and 155.5'		[Symbolic Log]	Limestone 151.8-154.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), fossiliferous (casts and molds), small (<1/16") voids cover 15% of surface, few clasts (<3/16") of lighter colored material, laminated bedding from 153.5 -154.0 154.0-154.7' - light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2), small (1/16") voids over 20% of surface No Recovery 154.7-155.0' Limestone 155.0-155.5' - Same as 154.0-154.7' except with irregular uneven thinly laminated bedding 155.5-158.0' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), poorly fossiliferous, gradual contact below, few small (<1/16") voids 158.0-158.9' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, weak (R2), small (<1/16") voids cover about 50% of surface 158.9-159.6' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), few small (<1/16") voids, group of healed vertical fractures from 158.9-159.3' No Recovery 159.6-160.0' Limestone 160.0-161.5' - moderate yellowish brown, (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), small (<1/16") voids cover about 25% of core surface, thin (1/2") zones have no small voids 161.5-162.1' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, strong (R4), small (<1/16") voids, few fossil molds and casts No Recovery 162.1-165.0' Limestone 165.0-168.0' - Same as 161.5-162.1' except except larger voids and fossil molds/casts (3/16") over 5% of area from 165.0-166.3', laminated bedding at 166.0-167.5' 168.0-169.2' - light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2), small (1/16") voids over 15% of surface, clasts of light gray (N7), limestone up to 3/16"x1-3/16" cover <5% of surface, clasts are oriented horizontally No Recovery 169.2-170.0'	SC-13 collected at 155.6-156.5' R25: 7 minutes End of drilling for 4/25/07, 160' at 15:45. Resume coring at about 07:35, 4/26/07 Core barrel was clogged. Barrel was cleared and run completed. Rock fragments at top of run are probably pieces from first attempt; bit marks in 2 directions are on some fragments End of R26-HQ fits together with start of R27-HQ R26: 4 minutes
160			2	155.2-155.45' - Fracture, 45 deg, rough, undulating				
-117.7			1	156.65, 156.7' - Fractures (2), horizontal, smooth, undulating, open up to 1/2"				
160.0			>10	157.9-158.1' - Fracture, 45 deg, rough, undulating, dark staining on faces (50% of area)				
			1	158.3-158.9' - Fracture zone, most fractures appear to be horizontal				
	NR	159.5' - Fracture, horizontal, smooth, planar						
	NR	160.0-160.3' - Fracture zone, multiple fragments up to 1-1/2"						
	NR	161.1' - Fracture, horizontal, smooth, planar, open up to 1/8"						
	NR	161.4' - Fracture, horizontal, open up to 1"						
	NR	162.0' - Mechanical break						
165	R27-HQ 5 ft 84%	38	2	165.2' - Fracture, 15 deg, rough, undulating, open to up to 1/4"		[Symbolic Log]		R27: 6 minutes End of core at 169.2' fits together with start of core at 170.0' SC-14 collected at 172.0-172.85' R28: 6 minutes
-122.7			4	165.5' - Fracture, horizontal, rough, undulating, open up to 1/2"				
			2	166.1' - Fracture, horizontal, rough, undulating, open up to 1/2"				
			3	166.55-167.2' - Fracture zone, horizontal, smooth, planar, spaced at about 0.05'				
			0	167.7' - Fracture, horizontal, smooth to planar on one side, rough to undulating on the other, open to about 3/4"				
			NR	168.3' - Fracture, horizontal, rough, undulating, dark staining on 40% of surface, open to 1/4"				
170			NR	168.3-168.7' - Fracture, 75 deg, rough, undulating, open <1/4"				
-127.7	0	168.9' - Mechanical break						
	0							
	2	172.1' - Fracture, horizontal, rough, undulating on one face, smooth to planar on the other, open up to 1/2"						
	3	172.95' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt on one face, open up to 1/2"						
175	3	173.15-173.3' - Fracture, 45 deg, rough, undulating, tight						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-20	SHEET 10 OF 14
ROCK CORE LOG		

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 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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-132.7	R29-HQ 5 ft 72%	23	5	173.7, 173.9' - Fractures (2), horizontal, smooth, planar, open up to 1/4"		Limestone 170.0-172.0' - Same as 168.0-169.2' except moderately fossiliferous (molds and casts), gray clasts now 5% of core, area of 3/16" to 3/8" voids from 171.0-171.6 172.0-173.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), small (1/16") voids over 15% of surface 173.7-175.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), small (<1/16") voids cover about 20% of core surface 175.0-178.0' - Same as 173.7-175.0' except with larger (3/8"x3/8") cavities from 175.7-177.4' and fewer small (1/16") voids below 176.0' 178.0-178.6' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated bedding with few small (1/16") voids (bedding about 1/2" thick) No Recovery 178.6-180.0' Silty Sand (SM) 180.0-180.4' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, carbonate derived Limestone 180.4-181.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong (R3), thinly laminated bedding, few small (<1/16") voids 181.1-183.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to strong (R1 to R4), few small (<1/16") voids, few fossil molds/casts (3/16"), large (3/8"x1-3/16") void at 183' 183.5-184.5' - yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), small (<1/16") voids cover about 25% of surface, larger (3/16") voids and fossil molds are about 5%, moderately fossiliferous No Recovery 184.5-185.0' Limestone 185.0-186.6' - Same as 183.5-184.5' except few fossil casts/molds, few larger voids. 186.6-187.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), laminated bedding (1/2"-1" thick), small (<1/16") voids present in alternating bedding laminations	R29: 4 minutes	
			1	174.0, 174.4, 174.5' - Fractures (3), horizontal, rough, undulating, coating of silt infill at 174.0', open up to 1/2"				
			>10	175.2, 175.3, 175.35, 175.6, 175.7' - Fractures (5), horizontal, rough, planar, open 1/8" to 1/4"				
			2	175.7-176.2' - Fractures (2), 70 deg, rough, undulating, tight				
			NR	177.2' - Fracture, horizontal, rough, undulating, tight 177.4-178.2' - Fracture zone				
180	R30-HQ 5 ft 90%	13	2	178.3' - Fracture, smooth, undulating, open up to 1/8"		R30: 9 minutes		
-137.7			>10	178.4' - Fracture, 45 deg, rough, undulating, open <1/8"				
			3	180.0-180.6' - soil and rock fragments 180.1, 180.95' - Fractures (2), horizontal, smooth, planar, coating of carbonate derived silt, open up to 1/8"				
			4	181.1-181.7' - Fracture zone 182.0' - Fracture, 20 deg, rough, undulating, open up to 1/8"				
			1	182.3' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt, open to 1/4"				
			NR	182.7' - Fracture, horizontal, rough, undulating, rock fragments up to 1", open 183.0, 183.2, 183.4, 183.5' - Fractures (4), horizontal, rough, undulating, open from 1/4 to 1/2"				
185	R31-HQ 5 ft 100%	52	1	184.3' - Fracture, horizontal, smooth, undulating, open up to 3/8"		R31: 10 minutes		
-142.7			7	185.5' - Fracture, 30 deg, rough, undulating, dark staining on 40% of surface, tight				
			4	186.4-187.0' - Fractures (6), horizontal, smooth, planar, except at 186.4' which is rough and undulating, all are open up to about 1/4"				
			3	186.8-187.0' - Fracture, vertical, rough, undulating, tight				
			3	187.1' - Fracture, horizontal, smooth, planar, open up to 1/4"				
			3	187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2"				
190	R32-HQ 5 ft 90%	65	3	188.0' - Fracture, 15 deg, rough, undulating, coating of carbonate derived silt, dark staining on 50% of surface, open to 1"		R32: 9 minutes		
-147.7			1	188.2' - Fracture, horizontal, rough, undulating, open up to 1/2"				
			1	188.8' - Fracture, horizontal, smooth, undulating, open up to 1/2"				
			3	188.8-189.0' - Fracture, vertical, rough, undulating, tight				
			1	189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface				
			NR	189.9' - Fracture, 55 deg, smooth, undulating 190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8"				
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PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-152.7	R33-HQ 5 ft 94%	23	1	190.6' - Fracture, 5 deg, rough, planar, open up to 1/4"	|	Limestone 187.5-188.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, strong (R4), very fossiliferous, small (<1/16") voids cover about 25% of surface, larger (> 3/8") voids and fossil molds/casts cover about 5% of surface 188.7-190.0' - Same as 185.0-186.6' except with zone of small (<1/16") voids 10% and fossil molds from 189.0-189.3', laminated bedding at top and bottom of interval 190.0-190.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, strong (R4), laminated bedding (1/4" to 3/4" thick beds), small (<1/16") voids present in alternating beds, 10% overall coverage 190.5-191.0' - moderate olive brown, (5Y 4/4), fine grained, mild to moderate HCl reaction, medium strong (R3), very fossiliferous, fragments (up to 1.5") of light olive grey (5Y 5/2) limestone, cavities up to 1.5" diameter occupy about 25% of core surface. 191.0-194.5' - dusky yellow to light olive, (5Y 6/4 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), with dusky yellow areas being weaker, crenelated bedding lamination grading into more uniform laminated bedding by 194.0', small (<1/16") voids about 10% coverage, trace organics, large (3/8"x1-3/16") cavity at about 192.0'	SC-16 collected at 195.5-196.8'	
2			191.1-191.3' - Fracture, 45 deg, rough, undulating, tight					
>10			192.1' - Fracture, horizontal, rough, undulating, open up to 1/4"					
>10			193.3' - Fracture, horizontal, rough, undulating, tight					
0			193.7, 193.8' - Fractures (2), horizontal, rough, undulating, open up to 3/4"					
NR			195.0-195.5' - rock fragments with rough and undulating surfaces					
200	R34-HQ 5 ft 100%	48	6	196.8' - Fracture, 45 deg, rough, undulating, tight	|	194.5-195.0' - No Recovery 194.5-195.0' Limestone 195.0-198.0' - yellowish gray, (5YR 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fossiliferous, small voids (1/16") over 30% of surface, larger (3/16") cavities over < 5% of surface (molds/casts) 198.0-199.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), laminated bedding 198.0-198.8, few fossil molds/casts, small (<1/16") voids about 10% coverage No Recovery 199.7-200.0'	R33: 7 minutes End of drilling, 200', 4/25/07 at 10:57 Resume drilling 5/1/07 R. McComb is the logging person from 200' to the end of borehole SC-17 collected at 202.95-204.05' R34: 9 minutes	
>10			169.9-197.3' - Fracture, 70 deg, rough, undulating, open up to 1/2"					
4			197.4-197.8' - Fracture, 60 deg, rough, undulating, open up to 1/8"					
0			197.8-198.5' - Fracture zone, multiple fragments up to 3" long					
1			200.1' - Fracture, <5 deg, rough, undulating, loose					
NR			200.2' - Fracture, <5 deg, rough, stepped, loose					
205	R35-HQ 5 ft 97%	52	1	200.55, 200.82' - Fractures (2), horizontal, rough, undulating, loose	|	195.0-198.0' - yellowish gray, (5YR 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fossiliferous, small voids (1/16") over 30% of surface, larger (3/16") cavities over < 5% of surface (molds/casts) 198.0-199.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), laminated bedding 198.0-198.8, few fossil molds/casts, small (<1/16") voids about 10% coverage No Recovery 199.7-200.0'	SC-18 collected at 207.55-209.04' R35: 6 minutes	
3			200.9, 200.95' - Fractures (2), horizontal, smooth, stepped, loose					
1			200.95-201.85' - Fracture zone, horizontal, rough, stepped to undulating, loose					
0			202.25' - Fracture, 20 deg, rough, stepped, loose					
3			202.35' - Fracture, 40 deg, rough, stepped to undulating, loose					
NR			202.8' - Fracture, horizontal, rough, stepped to undulating, loose					
210	R36-HQ 5 ft 80%	0	>10	202.95' - Fracture, horizontal, smooth, planar, loose	|	195.0-198.0' - yellowish gray, (5YR 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fossiliferous, small voids (1/16") over 30% of surface, larger (3/16") cavities over < 5% of surface (molds/casts) 198.0-199.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), laminated bedding 198.0-198.8, few fossil molds/casts, small (<1/16") voids about 10% coverage No Recovery 199.7-200.0'	R36: 5 minutes	
>10			204.05' - Fracture, 40 deg, rough, stepped, tight					
>10			205.4' - Fracture, <5 deg, rough, stepped, loose					
>10			206.2' - Fracture, 0-90 deg, rough, stepped, tight					
NR			206.8, 206.9' - Fractures (2), 40 deg, rough, stepped, loose					
NR			207.7' - Fracture, 70 deg, rough, stepped, loose					
215	R36-HQ 5 ft 80%	0	>10	209.01' - Fracture, horizontal, smooth, planar, loose	|	195.0-198.0' - yellowish gray, (5YR 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fossiliferous, small voids (1/16") over 30% of surface, larger (3/16") cavities over < 5% of surface (molds/casts) 198.0-199.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), laminated bedding 198.0-198.8, few fossil molds/casts, small (<1/16") voids about 10% coverage No Recovery 199.7-200.0'	R36: 5 minutes	
>10			209.1, 209.27' - Fracture (2), <5 deg, smooth, undulating, loose					
>10			210.1' - Fractures (2), horizontal, smooth, planar, loose					
NR			210.3' - Fracture, 60 deg, smooth, stepped, loose					
NR			210.5, 210.6' - Fractures (2), horizontal, smooth, planar, loose					
NR			210.5, 210.6' - Fractures (2), horizontal, smooth, planar, loose					



PROJECT NUMBER: 338884.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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-172.7	R37-HQ 5 ft 98%	55	3	210.9' - Fracture, <5 deg, rough, stepped, loose		Limestone 200.0-205.0' - yellowish gray, (5Y 7/2), very fine grained, weak to medium strong (R2 to R3), cavities up to 1/16" over to 40% of surface (more common 204.0-205.0) with zone of cavities interbedded with zones of few cavities. Cavities typically 1/16"x1/16" (casts/molds), largest is 2"x1/2" at 203.55 Limestone 205.0-206.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to very fine grained, weak (R2), with angular medium strong (R3) limestone fragments (brecciated), cavities cover 50% in fine grained material, about 3-5% in fine grained angular limestone rock fragments 206-208.7' - light olive gray, (5Y 5/2), fine to very fine grained, mild HCl reaction, very weak (R1), cavities of 1/16" to 1/32" covering 40-50% of surface, trace fossil casts/molds 208.7-209.85' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, very weak (R1), voids/cavities up to 3/8"x3/8" covering 30-40% of surface, becoming very thinly laminated with depth No Recovery 209.85-210.0' Limestone 210.0-210.6' - Same as 208.7-209.85' except voids <10% 210.6-211.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), cobble- to gravel-sized limestone, voids up to 1/16" covering 20-30%, trace fossil mold/casts 211.4-213.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), extremely weak (R0), voids and cavities up to 1"x1-3/16" cover 100% of surface, fossil molds/casts 213.3-214.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, weak (R2), interlaminated with very fine grained, weak (R2) limestone No Recovery 214.0-215.0' Limestone 215.0-218.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), coarser grained limestone with voids and cavities up to 3/8"x3/16" over 30-40% of surface, fossiliferous (molds/casts),	SC-19 collected at 217.45-218.25' R37: 6 minutes	
220	220.0	NR	>10	210.9' - Fracture, <5 deg, rough, stepped, loose 210.9-211.5' - Fracture zone, various orientations, rock fragments 211.5' - Fracture, 20 deg, rough, stepped, loose 212.0, 212.1' - Fractures (2), 40 deg, rough, undulating, loose 212.25, 212.55' - Fractures (2), <5 deg, rough, undulating, loose 212.8-213.1' - Fracture zone, 40-0 deg, rough, loose 213.3, 213.45' - Fractures (2), <5 deg, rough, stepped, loose 213.75, 213.85' - Fractures (2), horizontal and vertical, rough, stepped, loose 214.0' - Fracture, horizontal, rough, undulating, loose 215.1' - Fracture, horizontal, smooth, undulating, loose 215.6, 215.75' - Fractures (2), <5 deg, rough, stepped, loose 216.2' - Fracture, <5 deg, rough, undulating, loose 216.65' - Fracture, 40 deg, rough, undulating, loose 216.85-217.1' - Fracture zone, 0-90 deg, rough, undulating to stepped, loose 217.45' - Fracture, <5 deg, rough, undulating, loose 218.3' - Fracture, horizontal, smooth, stepped, loose 218.45-219.3' - Fracture zone, 0-90 deg, smooth to rough, undulating, loose 219.3' - Fracture, <5 deg, rough, stepped, loose 220.01-220.45' - Fracture zone, various orientations 220.85' - Fracture, 50 deg, rough, stepped, loose 221.2' - Fracture, 20 deg, smooth, planar, loose 221.65' - Fracture, 60 deg, rough, undulating, loose 221.85' - Fracture, <5 deg, rough, stepped to undulating, loose 222.3' - Fracture, 0-50 deg, rough, stepped, loose 222.55-222.7, 222.9 - 223.1' - Fracture zone, horizontal, rough, stepped, loose 225.0-226.0' - Fracture zone, limestone fragments, various orientations 226.55' - Fracture, horizontal, rough, stepped, loose 226.7, 226.85' - Fractures (2), horizontal, smooth, planar, loose 227.1-227.6' - Fracture zone, 0-90 deg, rough, stepped 227.6' - Fracture, horizontal, smooth, loose 227.6-227.8' - Fracture, vertical, rough, stepped, tight				
-177.7	R38-HQ 5 ft 66%	14	3					
			>10					
			0					
			NR					
225	225.0		>10					
-182.7	R39-HQ 5 ft 70%	12	3					
			>10					
			NR					
230	230.0		>10					
-187.7	R40-HQ 5 ft 48%	8	0					
			NR					
235	235.0							



PROJECT NUMBER: 338884.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 : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-192.7	R41-HQ 5 ft 20%	0	>10		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 HCl reaction, weak (R2), no voids/cavities Limestone 220.1-220.5' - dusky yellow, (5Y 6/4), moderate HCl reaction, weak to very 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 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 HCl reaction, weak to very weak (R2 to R1), trace fossil molds/casts, voids (<1/16") 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'	R41: 4 minutes	
240 -197.7	R42-HQ 5 ft 54%	8	>10 2		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 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	R42: 5 minutes	
245 -202.7	R43-HQ 5 ft 16%	0	>10		245.0-245.8' - Fracture zone, various orientations, gravel and cobble sized rock fragments	R43: 2 minutes	
250 -207.7	R44-HQ 5 ft 18%	0	>10		250.0-250.9' - Fracture zone, various orientations, gravel and cobble sized rock fragments	R44: 4 minutes	
255							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/24/2007 END : 5/1/2007 LOGGER : C. Dougherty, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
-212.7	R45-HQ 5 ft 54%		NA	257.2-257.7' - Fracture zone, 0-90 deg, smooth to rough, undulating to stepped		Limestone 240.0-242.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak (R1), voids typically 1/16" or less over 60-70% surface, rare cavities (3/8"x3/8"), fossil casts/molds rare, sandy/friable texture, 1 to 2 thin very fine grained limestone laminae 241.0-242.0 No Recovery 242.7-245.0' Limestone 245.0-245.8' - Same as 240.0-242.7' No Recovery 245.8-250.0' Limestone 250.0-250.9' - Same as 245.0-245.8' No Recovery 250.9-255.0' Poorly Graded Sand (SP) 255.0-256.8' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), wet, loose, mild to moderate HCl 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 HCl reaction, very weak (R1), fossiliferous, molds and casts, voids and cavities No Recovery 257.7-260.0'	R45: 4 minutes		
260		0	>10					260.0-267.7' - Fracture zone, 0-90 deg, rough, stepped to undulating, loose, gravel sized rock fragments	
-217.7		0	>10						
265	R46-HQ 5 ft 34%		NR			Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl 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 HCl 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 5/1/2007			
-222.7		0							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.4						Start with 2-7/8" bit J. Schaffer and Le Blanc start logging
3.5						
5	1.1	SS-1	4-3-3 (6)	Silty Sand (SM) 3.5-4.6' - yellowish gray, (5Y 7/2), moist to wet, loose, very fine to fine grained, no HCl reaction, trace organics, 20% low plastic fines, trace organics, root fragments, sand is silica		
37.4	5.0					
8.5						
10	1.0	SS-2	4-8-13 (21)	Silt (ML) 8.5-9.5' - dark yellowish orange, (10YR 6/6), wet, very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, very strong (R5), 5-10% very fine to fine sand, carbonate materials		Driller's Remark: Harder drilling at 10.5'
32.4	10.0					
13.5						
15	0.8	SS-3	17-50/3 (67/9")	Silt (ML) 13.5-14.3' - dark yellowish orange, (10YR 6/6), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 13% very fine to fine sand-sized grains		Driller's Remark: Slight circulation loss at 15.0'
27.4	14.3					
18.5						
18.9	0.1	SS-4	50/5 (50/5")	Limestone Fragments 18.5-18.6' - yellowish gray, (5Y 8/1), mild to moderate HCl reaction, highly fossiliferous		
20	18.9					



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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
22.4							
23.5							
25	1.5	SS-5	17-26-20 (46)	Silt With Sand (ML) 23.5-25.0' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% very fine to medium sand-sized grains, all carbonate			
17.4							
28.5							
30	1.1	SS-6	3-2-2 (4)	Silty Sand With Gravel (SM) 28.5-29.6' - moderate yellowish brown, (10YR 5/4), wet, very loose, fine to coarse grained, mild HCl reaction, 25% fine gravel-sized, 39% nonplastic fines, gravel-sized material appears to be limestone fragments			
12.4							
33.5							
35	0.8	SS-7	26-36-50/2 (86/8")	Gravelly Silt With Sand (ML) 33.5-34.25' - dark yellowish orange to dark olive gray, (10YR 6/6 to 5Y 5/2), wet, hard, nonplastic, very rapid dilatancy, strong HCl reaction, 30% fine gravel-sized limestone fragments, 20% fine to coarse sand, mild to moderate HCl reaction for limestone			
7.4							
34.7							
38.5							
39.4	0.9	SS-8	37-50/5 (87/11")				
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21	SHEET 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 bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.4				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 fines, trace organics and/or black minerals, appears massive with no bedding, carbonate materials		
43.5						
44.4	0.8	SS-9	47-50/5 (97/11")	Silty Gravelly Sand (SM) 43.5-44.3' - moderate yellowish brown, (10YR 5/4), moist to wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 30% fine to coarse gravel-sized limestone fragments, 20% nonplastic fines, all carbonate materials		
45 -2.6						
48.5						
50.0	0.9	SS-10	2-2-20 (22)	Silty Sand With Gravel (SM) 48.5-49.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, medium dense, fine to coarse grained, mild HCl reaction, 25% fine to coarse gravel-sized limestone fragments, 20% nonplastic fines, all carbonate		
50 -7.6						
53.5						
55.0	1.5	SS-11	9-22-14 (36)	Silty Sand With Gravel (SM) 53.5-55.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, dense, fine to coarse grained, mild HCl reaction, 20% fine gravel-sized limestone fragments, 25% nonplastic fines, trace organics, all carbonate		
55 -12.6						
58.5	0.0	SS-12	50/1 (50/1")	Limestone Fragments 58.5' - few coarse sand-sized limestone fragments recovered		No chatter, smooth drilling
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21	SHEET 4 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 bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.6						
63.5						
63.9	0.4	SS-13	50/5 (50/5")	Silt With Sand (ML) 63.5-63.9' - moderate yellowish brown, (10YR 5/4), moist to wet, hard, nonplastic, very rapid dilatancy, mild HCl reaction, 15-20% fine to coarse sand, all carbonate		SS-13 appears like extremely weak limestone 65-67' Minor drill chatter Driller's Remark: "Soft" at 67' but maintained circulation
65 -22.6						
68.5						
68.9	0.2	SS-14	50/4 (50/4")	Limestone Fragments With Silt And Sand 68.5-68.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, dense, nonplastic, mild HCl reaction, all carbonate		Driller's Remark: "Soft" 70-72', but maintained circulation Minor drill chatter 72-73'
70 -27.6						
73.5						
73.9	0.1	SS-15	50/4.5 (50/4.5")	Limestone Fragments 73.5-73.6' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, coarse gravel-sized fragments, fossiliferous		Driller's Remark: "Soft" at 75-77' Minor drill chatter 77-78'
75 -32.6						
78.5						
78.7	0.0	SS-16	50/2 (50/2")	Limestone Fragments 78.5' - one coarse sand-sized limestone fragment recovered		Driller's Remark: "Soft" at 78-78.5'
80						



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-37.6						Significant drill chatter 80-82'
						Driller's Remark: 82-83.5', soft drilling
83.5						
84.4	0.8	SS-17	47-50/5 (97/11")	Silty Gravelly Sand (SM) 83.5-84.3' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild HCl reaction, 32% fine to coarse gravel-sized limestone fragments, 19% nonplastic fines, all carbonate		Sporadic drill chatter 85-87'
85						Drill chatter 87-88'
-42.6						Driller's Remark: "Softened considerably" 88-88.5'
88.5						
90	1.0	SS-18	7-2-15 (17)	Silt (ML) 88.5-89.0' - moderate yellowish brown, (10YR 5/4), wet, stiff, low plasticity, rapid dilatancy, mild HCl reaction, 10-15% very fine sand-sized grains, sharp contact at bottom		
-47.6				Silty Gravelly Sand (SM) 89.0-89.5' - Same as 83.5-84.3'		Circulation loss at 90' Water level on 3/12/07 at 08:00 4.72' from top of 10" casing Set 15' of 6" casing then set 90' of 4" casing (HW); changed to 3-7/8" bit
90.0						
93.5						
93.7	0.1	SS-19	50/2 (50/2")	Limestone Fragments 93.5-93.6' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, 20% coverage of small (1/16") voids on fragment surfaces, several fine gravel-sized limestone fragments		Maintained circulation from 90-115'
95						
-52.6						
98.5						
99.3	0.8	SS-20	37-50/4 (87/10")			
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
 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 bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
-57.6			6"-6"-6" (N)	Silty Gravelly Sand (SM) 98.5-99.3' - moderate yellowish brown, (10YR 5/4), wet, dense, fine to coarse grained, mild HCl reaction, 30% fine to coarse gravel-sized material, 25% fines, sand and gravel-sized material appears to be limestone fragments		Soft steady drilling with no chatter Slight drill chatter at 102.5'
103.5						
104.5	0.4	SS-21	10-50/5.5 (60/11.5")	Silt With Sand And Gravel (ML) 103.5-103.9' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, mild HCl reaction, interbedded layers of silt and sand-sized and fine to coarse gravel-sized limestone fragments		Driller's Remark: Smooth soft drilling from 105' to 108.5'
105						
-62.6						
108.5						
108.9	0.2	SS-22	50/5 (50/5")	Limestone Fragments 108.5-108.7' - mild HCl reaction, coarse sand-sized and fine to coarse gravel-sized limestone fragments		Minor chatter at 107' and 108'
110						
-67.6						
113.5						
114.8	1.3	SS-23	21-12-20 (32)	Silt With Sand (SM) 113.5-115.0' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 20-25% very fine sand-sized carbonate particles, scattered fine to coarse sand-sized particles, coarse gravel-sized limestone fragments		Advanced 4" casing from 95' to 115' below ground surface. Ground water level on morning of 3/13/07 is 4.69' below top of casing Maintained circulation from 115' 115-117' Soft drilling with no chatter
115						
-72.6						
118.5						
119.6	1.1	SS-24	8-30-50/1.5 (80/7.5")			117-117.5', Sporadic minor drill chatter Drill chatter 117.5'-118', softened 118'-118.5'
120						



PROJECT NUMBER: 338884.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
 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 bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-77.6				Silty Sand With Gravel (SM) 118.5-119.6' - moderate yellowish brown, (10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 20% gravel-sized limestone fragments, 15% nonplastic fines, all carbonate			Driller's Remark: Drill chatter 120-122', soft 122-123', drill chatter 123-123.5'
123.5	123.8	0.3	SS-25	50/4 (50/4")	Silty Sand With Gravel (SM) 123.5-123.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 20% gravel-sized limestone fragments, 15% nonplastic fines, all carbonate		Chatter 125-126' Driller's Remark: Softened considerably on 126-128.5', circulation maintained to 136'
125							
-82.6	128.5				Silty Gravelly Sand (SM) 128.5-129.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 30% gravel-sized limestone fragments, 22% nonplastic fines, all carbonate		Driller's Remark: Soft 130-132.5' Driller's Remark: Harder 132-133.5', minor chatter observed on 133-133.5'
130	130.0	1.1	SS-26	19-25-33 (58)			
-87.6	133.5	133.8	0.3	SS-27	50/3 (50/3")	Silty Sand With Gravel (SM) 133.5-133.75' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very dense, mild HCl reaction, fine to coarse sand-sized limestone fragments, 20% gravel-sized limestone fragments, 15% nonplastic fines, all carbonate	Steady chatter 135-138.5' Significant chatter 136-138.5' Circulation loss at 136.5'
135							
-92.6	138.5	138.7	0.2	SS-28	50/2.5 (50/2.5")	Limestone Fragments 138.5-138.7' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, fine to coarse sand-sized fragments, few voids or fossils, trace black particles, possibly pyrite	Very hard at 139.0' End of soil boring at 139', begin rock coring
140							Begin Rock Coring at 139.0 ft bgs See the next sheet for the rock core log



PROJECT NUMBER: 338884.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 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. Faureto

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
140 -97.6	R1-NQ 2.5 ft 80%	14	>10	139.0-140.0' - Fracture zone, multiple laminated wavy discontinuities and fractures		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 voids (< 1/16") spheroidal to irregular shaped, thinly bedded to laminated, poorly fossiliferous (molds/casts) No Recovery 141.0-141.5' Limestone 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, granular/sucrosic texture, traces of fine grain medium dark gray (N4) particles No Recovery 143.9-146.5'	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' R1: 29 minutes	
145 -102.6	R2-NQ 5 ft 48%	17	5	140.0' - Bedding plane or mechanical break, 10 deg, smooth, planar, tight 140.2' - Bedding plane, 5 deg, smooth, planar, tight 140.7' - Bedding plane, 5 deg, rough, undulating, gray discoloration over 60% of surface, tight 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" 141.8' - 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" 143.3' - Fracture, 50 deg, rough, undulating, tight 143.6' - Fracture, 70 deg, rough, undulating, open 143.6-143.9' - Fracture zone, 3/16" - 1-9/16" subangular rock fragments 146.6' - Fracture, 10 deg, rough, undulating, open 1/8" 147.1' - Mechanical break, 5 deg, rough, undulating 147.2-147.6' - Fracture zone, rough, undulating, rock fragments 147.8' - Fracture, 30 deg, smooth, undulating, trace staining of black speckles 148.2-148.7' - Fracture zone, 30-40 deg 148.2' - Fracture, 30-40 deg, rough, stepped, tight 148.7' - Fracture, 5 deg, rough, undulating, open 1/8" 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" 149.6' - Fracture, 40-45 deg, rough, undulating, trace black staining 149.7-150.6' - Fracture zone, 40-50 deg, multiple 40-50 deg fractures and angular fragments with black staining 150.25, 158.3' - Bedding plane (2), horizontal, rough, undulating, tight 152.1' - Fracture, 25 deg, rough, undulating, tight 152.3' - Fracture, 70 deg, rough, undulating, black stains over 85% of surface 152.4' - Fracture, horizontal, rough, undulating, open 1/4" 152.55' - Bedding plane, horizontal, rough, undulating, open 1/4"				Slight circulation loss at 144' R2: 46 minutes
150 -107.6	R3-NQ 5 ft 82%	20	>10	146.5		Limestone 146.5-147.6' - Same as 142.3-143.9' 147.6-150.6' - light olive gray, (5Y 5/2), fine to medium grained, moderate HCl reaction, medium 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 medium grained medium dark gray (N4) particles No Recovery 150.6-151.5'	Harder drilling at 148' R3: 15 minutes	
155 -112.6	R4-NQ 5 ft 86%	23	>10	151.5		Limestone 151.5-155.8' - light olive gray with medium light gray and very pale 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 on 25% of surface, massive bedding except laminated from 153.4-159.9' No Recovery 155.8-156.5'	R4: 28 minutes	
	R5-NQ		2	156.5				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faureto

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION						
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS						
160 -117.6	5 ft 84%	53	4	152.7' - Bedding plane, horizontal, rough, planar, grayish orange (10YR 7/4) stains on 25% of surface	[Symbolic Log: 10' intervals]	Limestone 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 grained, moderate HCl reaction, weak to medium strong (R2 to R3), 3/8" voids on 15% of surface (40-45% at 158.0-159.0'), casts over 45% of surface, trace cavities (3/16-1/8"), voids and cavities have an elongated subhorizontal alignment, cavities concentrated from 156.5 -157.0' and 160.0-160.5' No Recovery 160.7-161.5' Limestone 161.5-165.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts/molds, 1/16" and smaller), 30% voids (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' Limestone 166.5-169.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, 35-40% small (1/16") voids concentrated at 166.5-167.3, moderately fossiliferous (molds up to 3/8" x 1-3/8") No Recovery 169.0-171.5'	SC-1 collected at 158.95-159.9' R5: 47 minutes			
			4	153.0' - Fracture, 75-80 deg, rough, undulating, black stain over 10-15% of surface						
			NR	153.2, 153.3, 153.4, 153.55, 153.7' - Bedding plane (5), horizontal, rough, planar, open < 1/16"						
			2	153.7-153.95' - Fracture zone, fragments <3/4"						
			1	153.95, 154.1, 154.3, 154.4, 154.6' - Bedding plane (5), 5-10 deg, tight, brownish black staining on surface						
			5	154.9' - Fracture, 80 deg, rough, undulating, tight, 5-10% staining as black speckles						
			3	155.2, 155.25' - Bedding plane (2), horizontal, rough, planar, tight						
			NR	155.4' - Bedding plane or mechanical break, 30-40 deg, rough, undulating, open 1/4"						
			NR	156.6' - Mechanical break, horizontal, rough, open 1/16"						
			NR	156.8' - Fracture, 60-70 deg, rough, undulating, tight						
165 -122.6	R6-NQ 5 ft 73%	27	>10	157.6' - Bedding plane, 30 deg, rough, undulating, tight	[Symbolic Log: 10' intervals]	Limestone 166.5-169.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, 35-40% small (1/16") voids concentrated at 166.5-167.3, moderately fossiliferous (molds up to 3/8" x 1-3/8") No Recovery 169.0-171.5'	R6: 35 minutes			
			3	157.85' - Bedding plane, horizontal, rough, planar, tight						
			1	158.5, 158.7, 158.8' - Bedding plane (3), horizontal, rough, planar, tight						
			NR	158.95' - Bedding plane, 15-20 deg, rough, undulating, tight						
			NR	159.9' - Bedding plane, horizontal, rough, planar, open 1/16"						
			NR	160.0, 160.4, 160.5' - Bedding plane (3), horizontal, rough, undulating, tight						
			NR	161.7' - Fracture, 80 deg, rough, undulating, tight						
			>10	161.9' - Bedding plane, horizontal, rough, undulating, open 1/4"						
			>10	163.2' - Fracture, 60 deg, rough, undulating, tight						
			2	163.5, 163.6' - Bedding plane (2), horizontal, rough, undulating, open 1/16"						
170 -127.6	R7-NQ 5 ft 50%	22	2	163.8, 163.95' - Bedding plane (2), horizontal, rough, undulating, 1/16" open	[Symbolic Log: 10' intervals]	Limestone 171.5-175.4' - light brown to yellowish gray, (5YR 6/4 to 5Y 7/2), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), laminated bedding 172.6-173.1' with alternating beds of very dark and light crystallized materials (pyrite and hematite), very fossiliferous (35% void spaces from fossil molds) from 173.1-175.4' No Recovery 175.4-176.5'	SC-2 collected at 167.55-168.25' Significant circulation loss R7: 26 minutes End drilling for day (3/14/07) at 171.5' Water level at 4.52' below top of casing 3/15/07 Advanced HW casing to 168' on 3/15/07 Water level is at top of casing when drilling resumed 3/20/07			
			3	164.2' - Fracture, 65-75 deg, rough, undulating, open 1/16", stains on 25% of surface						
			NR	164.6' - Fracture, 5-10 deg, rough, undulating, 1/4" open						
			NR	164.75-164.9' - Fracture zone, angular rock fragments						
			10	165.15' - Mechanical break, horizontal, rough, undulating, tight						
			6	166.6' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.1-167.25' - Fracture zone, rock fragments						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
175 -132.6	R8-NQ 5 ft 78%	22	NR	167.4' - Mechanical break, horizontal, rough, undulating, tight				[Symbolic Log: 10' intervals]	Limestone 176.5-176.8' - medium grained, mild HCl reaction, medium strong (R3), 35-40% fossil related void spaces	R8: 129 minutes
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
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			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
			NR	167.4' - Mechanical break, horizontal, rough, undulating, tight						
	R9-NQ									



PROJECT NUMBER:
338884.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

WATER LEVELS : 4.72 ft bgs on 3/12/07

START : 3/11/2007

END : 3/20/2007

LOGGER : C. LeBlanc, M. Faurete

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
180 -137.6	5 ft 78%	0	>10	167.5' - Fracture, 25 deg, rough, undulating, tight	[Symbolic Log]	176.8-177.35' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), thin to laminar bedded	Faurete start logging at 179' to the end of borehole
			>10	168.2' - Fracture, 30 deg, rough, undulating, tight			
181.5	R10-NQ 5 ft 40%	20	NR	168.45' - Fracture, 80 deg, rough, undulating, black stains on 15% of surface	[Symbolic Log]	177.35-180.4' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate to strong HCl reaction, indistinctly bedded and presents about 25% void space due to fossil casts and molds No Recovery 180.4-181.5' Limestone	R9: 67 minutes
			0	168.65' - Fracture, 20 deg, rough, undulating			
185 -142.6	R10-NQ 5 ft 40%	20	5	171.6' - Fracture, 45 deg, rough	[Symbolic Log]	181.5-183.5' - light brown, (5YR 6/4), very fine grained, mild HCl reaction, medium strong (R3), 25% void space from fossil molds and casts No Recovery 183.5-186.5' Limestone	R10: 23 minutes
			NR	171.75-172.3' - Fracture zone, multiple small fragments			
186.5	R11-NQ 5 ft 68%	0	>10	172.55, 172.75, 172.8' - Bedding plane (3), smooth, planar	[Symbolic Log]	186.5-188.1' - light brown, (5YR 5/6), very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), exhibits fossil related voids to 35% of the visible rock	Lost circulation from 189' to 195'
			9	172.8-172.95' - Fracture, rough, "L" shaped fracture			
190 -147.6	R11-NQ 5 ft 68%	0	>10	172.95-173.6' - Fracture zone or mechanical break	[Symbolic Log]	188.1-188.5' - moderate yellowish brown, (10YR 5/4), very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly to laminar bedded or pseudo bedded	R11: 35 minutes
			NR	173.85' - Mechanical break, rough, undulating, irregular, no fill			
191.5	R12-NQ 5 ft 72%	7	>10	174.0' - Fracture, rough	[Symbolic Log]	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 and gastropod casts, total void space about 30%, organic traces along some fossil casts No Recovery 189.9-191.5' Limestone	Void at 195.5' R12: 78 minutes
			6	174.25' - Fracture or mechanical break, horizontal			
195 -152.6	R12-NQ 5 ft 72%	7	>10	174.5-175.35' - Fracture zone, multiple breaks	[Symbolic Log]	191.5-191.8' - Same as 188.5-189.9'	The rock presents an overall picture of subsidence or collapse and reinduration due to the size, shape, and orientation of some of the fragments
			3	176.45-177.45' - Fracture zone, horizontal, rough to smooth, undulating, multiple fractures, most appear horizontal			
196.5	R13-NQ 3.8 ft 61%	9	NR	177.45-178.45' - Fracture zone, mostly horizontal fractures, mechanical breaks that look like shatter cones at 177.80'	[Symbolic Log]	191.8-192.1' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, laminar bedded	
			>10	178.45-179.5' - Fracture zone or mechanical break			
	R13-NQ 3.8 ft 61%	9	4	179.5-180.35' - Fracture zone, 2 flat surfaces and a broken zone	[Symbolic Log]	192.1-193.5' - mild HCl reaction, medium strong (R3), highly fossiliferous exhibiting 30% void spaces from casts and molds, and numerous shell fragments, apparent clasts of fine grained rock are visible within the fossil rich rock, solution cavities with iron oxide minerals or stains	
			1	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 smooth, planar faces			
				186.5' - Fracture zone, multiple broken fragments smaller than 1.5", no defined feature			
				187.75-188.35' - Fracture, vertical, rough, undulating			
				188.35' - Fracture, rough, planar, iron staining on surface			
				188.40' - Fracture, healed			
				188.65-188.95' - Fracture, vertical, exhibits very heavy solution erosion features and infilling or plating of iron oxides creating a very rough surface			
				191.5-191.9' - Fracture zone, numerous small rock fragments			
				191.7' - Fracture, smooth, planar			
				191.9' - Fracture, slightly rough, planar, iron 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			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurote

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.6	200.3		NR		197.0-198.1' - moderate yellowish brown to light brown, (10YR 5/4 to 5YR 6/4), mild HCl reaction, medium strong to strong (R3 to R4), solution channels along fracture plans 198.1-198.4' - light brown, (5YR 5/6), thin to laminar bedded in regular planes with silt and sand-sized grains in varying proportions 198.4-198.8' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, weak to medium strong (R2 to R3), fossil void spaces about 30% No Recovery 198.8-200.3 Bottom of Boring at 200.3 ft bgs on 3/20/2007	R13: 4 minutes Shows interrupted bedded and differential compaction, plus a variety of clasts types in less than 1/4" sizes. At 198.4' there is an undulant contact that looks like shallow ripple marks of low amplitude May exhibit healed subsidence features TD=200.3' at 17:48 on 3/20/07 Water level at 3' below ground surface on 3/21/07	



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 1 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
 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 : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.8	0.0	0.4	SS-1	4-5-6 (11)	Fill 0.0-0.4' - limestone, derived silt, sand and gravel mix		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 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
	1.5						
5	5.0	0.8	SS-2	1-1-2 (3)	Clayey Sand (SC) 5.0-5.75' - light bluish gray with light brown staining, (5B 7/1 with 5YR 5/6), moist, very loose, very fine to fine grained, no HCl reaction, 20% medium to high plasticity fines, sand is silica		
37.8	6.5						
10	10.0	1.3	SS-3	12-11-15 (26)	Silt (ML) 10.0-11.3' - grayish orange, (10YR 7/4), wet, very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5-10% very fine to fine sand-sized, all carbonate		
32.8	11.5						
15	15.0	0.6	SS-4	21-50/3 (71/9")	Silt With Limestone (ML) 15.0-15.6' - Same as 10.0-11.3' except scattered lenses of coarse sand- to fine gravel-sized limestone fragments, all carbonate		
27.8	15.8						
20							



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
 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 : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.8	20.0	1.5	SS-5	19-16-15 (31)	Silty Sand (SM) 20.0-21.5' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, dense, fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines, all carbonate derived		
	21.5						
25	25.0	1.4	SS-6	23-22-26 (48)	Sandy Silt (ML) 25.0-26.4' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, hard, nonplastic, 41% fine to medium grained sand		
17.8	26.5						
30	30.0	1.1	SS-7	4-20-50/1 (70/7")	Silty Sand (SM) 30.0-31.1' - Same as 25.0-26.4' except very dense, 25-30% nonplastic fines		
12.8	31.1						
							Heavy grinding and chattering; 10 minutes to drill 33.0-35.0'
35	35.0	0.0	SS-8	50/1 (50/1")	No Recovery 35.0-35.1' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		Set HW casing to 35' and switch to rock coring; see rock core log End of drilling for the day, 5/22/07
7.8	35.1						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 3 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
7.8	35.0						
	R1-HQ 5 ft 72%	50	1	35.6' - Bedding plane, 0-30 deg, rough, planar, tight	Limestone 35.0-38.6' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, very weak (R1), thin bedding, moderately fossiliferous (casts/molds), sample is 20-30% voids/casts <1/8", trace irregular shaped cavities 1/4"x1/8", trace coarse grain organic fragments, carbonate silt lenses present at 37.9-38.1' No Recovery 38.6-40.0'	Begin rock coring at 08:17, 5/23/07 R1: 5 minutes	
			1	36.8' - Bedding plane, 5-10 deg, rough, undulating, tight to open (1/8")			
			4	37.7' - Fracture, 50 deg, rough, undulating			
			2	37.85, 37.95, ' - Bedding plane (2), horizontal, wavy bedding plane contacts with carbonate fines			
			NR	38.5' - Mechanical break			
40 2.8	40.0				Limestone 40.0-43.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), 3-5% fine grain moderately dark gray (N4) particles in matrix, 5-7% coarse grain black particles, moderately fossiliferous (casts/molds), fossils (up to 3/8"), 15-25% voids/casts (<1/16") No Recovery 43.0-45.0'	R2: 3 minutes	
	R2-HQ 5 ft 60%	23	2	40.3, 40.4' - Mechanical break (2), horizontal, rough, undulating, tight			
			4	41.0, 41.1' - Mechanical break (2), horizontal, rough, undulating, tight			
			4	41.6, 41.8' - Bedding plane (2), horizontal, rough, undulating, tight			
			NR	42.15' - Fracture, 40 deg, smooth, planar, tight 42.2, 42.5, 42.9' - Mechanical break (3), <5 deg, rough, undulating, tight			
45 -2.2	45.0				Limestone 45.0-48.9' - dark yellowish brown, (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 (<1/8"), moderately fossiliferous (casts and molds), most fossils <1/8", trace dissolution cavities across the entire run No Recovery 48.9-50.0'	R3: 2 minutes	
	R3-HQ 5 ft 78%	15	>10	45.0-46.4' - Mechanical break, multiple irregular breaks			
			>10				
			6	47.2, 47.4, 47.6, 47.8, 48.4, 48.8, 48.9' - Mechanical break (7), horizontal, rough, undulating, tight			
			3				
50 -7.2	50.0				Limestone 50.0-54.2' - dark yellowish brown, (10YR 4/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 15-20% spheroidal and elongated voids <1/8", 5-10% elongated dissolution cavities unfilled, both elongated voids and cavities appear to be sub horizontally aligned, 3-5% organic material as coarse black particles and laminations at 51.3' and 52.3' No Recovery 54.2-55.0'	R4: 5 minutes	
	R4-HQ 5 ft 84%	28	>10	50.0-50.3' - Fracture zone, subangular rock fragments 1/2"-1-1/8" in size			
			5	50.0, 50.1, 50.3, 50.45' - Bedding plane (4), 5-10 deg, rough, undulating, open (1/16"), occurring on organic laminations			
			2	50.6, 50.7' - Bedding plane (2), 5-10 deg, rough, undulating, open (1/16")			
			2	51.7' - Bedding plane, horizontal, rough, undulating, open (1/8")			
			3	52.1, 52.65, 53.0, 53.15' - Bedding plane (4), 15-20 deg, rough, undulating, tight			
			0	53.25' - Bedding plane, 30 deg, rough, undulating, organics on upper surface			
55	55.0		NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 4 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-12.2	R5-HQ 5 ft 78%	47	>10	55.2-55.45' - Fracture zone, 1/4" to 1-1/2" rock fragments	[Symbolic Log]	Limestone 55.0-58.9' - pale yellowish brown with trace olive gray mottling, (10YR 6/2 with 5Y 4/1), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10-15% voids (<1/16"), elongated, poorly fossiliferous (casts), fossils are <1/16", 3-7% medium grained angular shaped black particles, trace short (<1/16") discontinuous black laminations grading from weak rock (R2) at top to medium strong rock (R3) at the bottom No Recovery 58.9-60.0'	SC-1 collected at 57.5-58.9'
3			55.65' - Bedding plane, 2-5 deg, rough, planar, open (<1/16")				
4			55.95' - Bedding plane, 5 deg, rough, stepped, open (<1/16")				
1			56.1, 56.3' - Mechanical break 56.5' - Fracture, 60 deg, rough, undulating, open (<1/8") 57.3' - Fracture, 50 deg, rough, undulating, open (<1/8")				
NR			57.4' - Bedding plane or mechanical break 57.5' - Bedding plane, horizontal, rough, stepped, 3/8" relief on surface 58.9' - Bedding plane or mechanical break, horizontal, rough, planar, open (< 1/16")				
60	R6-HQ 5 ft 92%	35	1	60.3' - Bedding plane, horizontal, rough, undulating, open (1/2")	[Symbolic Log]	Limestone 60.0-61.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moderate to strong HCl reaction, medium strong (R3), 3-5% voids <1/16", 5-10% horizontally aligned <3/8" flat black flakes 61.2-61.4' - Same as 60.0-61.2' except weak (R2), 25-35% voids <1/16", 5-10% coarse grain black particles 61.4-62.0' - Same as 60.0-61.2' 62.0-64.6' - Same as 61.2-61.4' No Recovery 64.6-65.0'	R5: 7 minutes
-17.2			2	61.2, 61.4' - Bedding plane or mechanical break (2), 5-10 deg, rough, undulating, open (3/4")			
60			3	62.0' - Bedding plane, horizontal, rough, undulating, open (1/8")			
65			4	62.3' - Bedding plane, 5-10 deg, rough, undulating, tight			
-22.2			0	62.5' - Mechanical break 62.8, 63.05, 63.3, 63.5, 63.8' - Bedding plane or mechanical break (5), horizontal, rough, undulating, open (<1/16")			
65			NR	65.6-65.78' - Fracture zone, rock fragments			
65	R7-HQ 5 ft 100%	68	>10	67.2' - Bedding plane, horizontal, rough, undulating	[Symbolic Log]	Limestone 65.0-71.0' - mottled pale yellowish brown and dark yellowish brown, (10YR 6/2 and 10YR 4/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10-15% voids <1/16", voids restricted to pale yellowish brown color, 3-7% medium grain black flakes present as short discontinuous laminations across rock sample, very thinly bedded at 69.0-69.3', mottled areas appear to be bioturbated zones oriented subhorizontally	SC-2 collected at 65.78-66.77'
-22.2			0	69.0' - Bedding plane, horizontal, rough, planar, 1/16" silt and/or clay sized infilling			
70			1	69.3' - Bedding plane, horizontal, rough, planar, tight medium grained black flakes on surface			
70			4	69.6' - Fracture, 20-30 deg, smooth, stepped, 1-3/4" fossil on fracture surface			
-27.2	R8-HQ 5 ft 88%	60	2	69.8' - Fracture, 80 deg, rough, planar, tight	[Symbolic Log]	71.0-74.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, 20-30% voids/casts <1/16", moderately fossiliferous with casts (up to 1/2"), 5-10% medium to coarse grain black particles, 3-5% medium to coarse grained dark gray angular to subangular shaped particles, 1/2" thick organic layer at 73.6', below 73.6' rock looks more weathered than above	R7: 10 minutes
70			2	70.68' - Bedding plane, 10-15 deg, rough, undulating, at top of extremely weak rock			
70			1	70.8' - Bedding plane, 5-10 deg, rough, undulating, top of fractured rock			
75			1	71.0' - Bedding plane, <5 deg, rough, undulating, base of fractured zone			
75			1	71.3' - Fracture, 80 deg, rough, undulating, tight, fracture up to 7" long			
75	NR	72.7' - Bedding plane, 5-10 deg, rough, undulating, tight					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 5 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-32.2	R9-HQ 5 ft 96%	40	0	73.6' - Bedding plane, 0-5 deg, rough, undulating, 1/2" thick organic layer	[Symbolic Log]	No Recovery 74.4-75.0' Limestone 75.0-78.6' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), moderate HCl reaction, weak (R2), 25-30% voids <1/16", trace unfilled cavities 1"x1/2" (mostly near bottom), moderately fossiliferous (casts), 3-7% fine to medium grained black particles; 1-1/2" thick organic lense 78.6-79.8' - Same as 75.0-78.6' except very weak (R1)	R9: 6 minutes
			1	73.8' - Mechanical break, 30 deg, rough, undulating, tight			
			>10	74.1' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
			>10	76.6' - Fracture, 30 deg, rough, undulating, tight			
			0	76.6-77.1' - Fracture, vertical, rough, undulating, black staining on 15% of surface, multiple intersecting mechanical breaks			
			NR	77.6-78.6' - Fracture zone, high angle fractures through an interval of apparently weathered rock			
80	R10-HQ 5 ft 88%	10	>10	78.6, 78.8' - Bedding plane (2), horizontal, rough, undulating, top and base of organic-rich carbonate fines layer		No Recovery 79.8-80.0' Limestone 80.0-84.4' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, weak (R2), moderately fossiliferous (cast/molds), 3-7% medium to coarse grain black particles, fossils (up to 5/8"), various fossil types present including tubular shaped organisms, top 0.4' of run appears weathered	R10: 10 minutes
-37.2			3	80.0-80.3' - Fracture zone, rock fragments			
			2	80.6' - Bedding plane or mechanical break, horizontal			
			2	81.0' - Fracture, 65-75 deg, rough, undulating			
			1	81.3' - Fracture, 30 deg, rough, undulating, tight			
			NR	81.7' - Fracture, 40 deg, rough, undulating, tight			
85	R11-HQ 5 ft 46%	15	NR	82.1' - Fracture, 30 deg, rough, undulating, top of zone of fragmented rock	No Recovery 84.4-85.0' Limestone 85.0-85.9' - pale yellowish brown, (10YR 6/2), strong HCl reaction, strong (R4), 5-10% void <1/16", 10-20% unfilled cavities irregularly shaped up to 1" in size, some are dissolution cavities, moderately fossiliferous (casts/molds), fossils up to 5/8" in size, intervals of weathering/dissolution cavities of fragmented core, subrounded to subangular in shape, brownish black staining on some fragments, stained dark yellowish brown over bottom 0.4'	SC-3 collected at 85.0-85.82' Circulation loss at 87.0' Core loss assumed to occur from 85.9-88.6' R11: 6 minutes	
-42.2			>10	82.7' - Fracture, 70-80 deg, rough, undulating, tight			
			>10	83.1' - Fracture, 70 deg, rough, undulating, tight			
			NR	83.2' - Fracture, horizontal, rough, undulating			
			NR	83.8-84.3' - Fracture zone			
			NR	84.3' - Fracture, 30-40 deg, rough, undulating, base of fractured zone			
90	R12-HQ 5 ft 94%	52	>10	85.9' - Fracture, 30 deg, rough, undulating, infilling on surface	No Recovery 85.9-88.6' Limestone 88.6-90.0' - Same as 85.0-85.9' 90.0-91.5' - moderate yellowish brown with 40% mottled with very pale orange, (10YR 5/4 with 10YR 8/2), moderately fossiliferous (cast/molds), fossils (mostly <1/4" but a few are up to 1/2"), 25-30% spheroidal voids (<1/16"), voids mostly restricted to the pale yellowish brown color areas	R12: 7 minutes	
-47.2			10	88.5-89.6' - Fracture zone, fragments from 3/8" to 1", staining on few surfaces, possibly weathered rock, possible dissolution cavity			
			2	89.7' - Fracture, 60 deg, rough, undulating, open (<1/16")			
			1	90.3-91.0' - Fracture zone, 1/2"-2" rock fragments			
			4	91.1' - Fracture, 40-50 deg, rough, undulating, open (2")			
			1	91.5' - Fracture, 70 deg, rough, undulating, open (1/16")			
95			NR	92.7' - Fracture, 5-10 deg, rough, undulating, open (<1/16")			
				93.0, 93.1' - Fracture (2), 30 deg, rough, undulating, tight			
				93.3' - Fracture, 50 deg, rough, undulating, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-52.2	R13-HQ 5 ft 52%	0	0	93.95, 94.3' - Bedding plane or mechanical break (2), 5-10 deg, rough, undulating, tight	91.5-94.7' - Same as 90.0-91.5' except pale yellowish brown, (10YR6/2), with brownish black rippled lamination at 94.5' No Recovery 94.7-95.0' Limestone 95.0-97.6' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained, weak to medium strong (R2 to R3), 15-20% elongated voids <1/8" sub horizontally oriented, moderately fossiliferous with casts up to 3/8" No Recovery 97.6-100.0'	SC-4 collected at 95.13-95.96'	
>10		>10	95.0-95.2' - Fracture zone, zone of mechanical breaks				
>10		>10	96.0-97.6' - Fracture zone, 50-70 deg, fractures are intersected by potential mechanical breaks				
100	R14-HQ 5 ft 64%	15	NR		100.0-103.2' - pale yellowish brown, (10YR 6/2), fine grained, moderately fossiliferous with casts up to 5/8" weathered over top 0.7', color may be due to potential staining or weathering, 10-15% medium to coarse grain black particles, trace short (1/16") discontinuous black laminations throughout core run No Recovery 103.2-105.0'	R13: 4 minutes	
-57.2		>10	>10	100.0-100.2' - Fracture zone			
		>10	0	100.5-100.75' - Fracture zone			
105	R15-HQ 5 ft 90%	18	0	100.9' - Fracture, 20 deg, rough, undulating, open (1/8")	105.0-109.5' - moderate yellowish brown with 15-20% dark yellowish brown mottling, (10YR 5/4 with 10YR 4/2), fine grained, moderate HCl reaction, weak (R2), 15-25% voids <1/16", poorly fossiliferous (molds), trace irregular shaped unfilled cavities up to 5/8"	R14: 3 minutes	
-62.2		0	0	101.4' - Fracture, 20 deg, rough, undulating, open (1/2")			
		NR	NR	101.6' - Fracture, 80 deg, rough, undulating, tight			
110	R16-HQ 5 ft 50%	38	>10	101.7' - Fracture, 0-10 deg, rough, undulating, tight	110.0-112.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak (R2), 5-10% voids up to 1/8", trace cavities up to 3/4"x3/4" infilled with fine grained weak (R2) carbonate material No Recovery 112.5-115.0'	R15: 5 minutes	
-67.2		0	9	101.8' - Fracture, 15-20 deg, rough, undulating, top of fractured zone			
		NR	2	102.0' - Fracture, 60 deg, rough, undulating, base of fractured zone			
115				105.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open (1/8")			
				105.35' - Bedding plane or mechanical break, 30 deg, rough, undulating, tight			
				107.35' - Fracture, horizontal, rough, undulating, open			
				107.35-107.55' - Fracture zone			
				107.6-107.8' - Fracture, 60 deg, rough, undulating, open (1/4")			
				107.95-108.7' - Fracture, 80 deg, rough, undulating, open			
				108.2' - Fracture, horizontal, intersects one fragment of fracture at 107.95-108.7'			
				108.4' - Fracture, horizontal, rough, undulating, open, intersects one fragment of fracture at 107.95-108.7'			
				108.8-109.0' - Fractures, 60 deg, rough, undulating, open			
				109.0-109.5' - Fracture, vertical, rough, undulating, open			
				109.5' - Fracture, 15 deg, rough, undulating, open			
				110.15' - Fracture, horizontal, rough, undulating, open			
				110.15-110.5' - Fracture, vertical, rough, undulating, open, rock fragments on smaller side of fracture			



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 7 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-72.2	R17-HQ 5 ft 60%	18	>10	111.0-111.5' - Fractures (2), 85 deg and vertical, rough, undulating, open	|	Limestone 115.0-118.0' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), fine to medium grained, 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"-3/16") voids, trace cavities up to 1-3/16"x3/8", 50% of cavities infilled with carbonate material similar to 110.0-112.5', visible shell fragments at 115.0-115.5', large (about 50% of core by volume) cavity (not infilled) at 115.45-115.65', strength of HCl reaction decreases with depth No Recovery 118.0-120.0' Limestone 120.0-124.5' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), fine grained, mild HCl reaction, weak (R2), except very weak (R1) at 124.1-124.5', very small (<1/16") voids, trace small (1/16"-1/8") voids, trace casts/cavities up to 3/4"x3/8", 10% casts/cavities at 120.0-120.75' with partial (carbonate) infilling No Recovery 124.5-125.0' Limestone 125.0-126.45' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, weak (R2), weathered, 10-15% (<1/16") voids, trace small (1/16"-1/4") voids, 5-10% casts/cavities up to 1-3/16"x3/4", poorly fossiliferous 126.45-127.0' - Same as 125.0-126.45' except weak to medium strong (R2 to R3), trace voids up to 1/16", no fossils casts/cavities No Recovery 127.0-130.0' Limestone 130.0-133.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), trace voids (<1/16), no visible casts/cavities, dark gray to black irregular laminae at 130.5-131.0' 133.1-133.3' - Same as 130.0-133.1' except very fine to fine grained, moderate HCl reaction, medium strong (R3)	R17: 4 minutes	
120			2	111.4-111.65' - Fracture, 60 deg, rough, undulating, open				
-77.2			4	111.65-112.0' - Fractures, 75 deg, rough, undulating, open				
120.0			NR	112.0-112.5' - Fracture zone				
				115.0-115.15' - Fracture zone				
	R18-HQ 5 ft 90%	57	>10	115.2, 115.35' - Fractures (2), <10 deg, rough, undulating, open	|		SC-5 collected at 120.88-121.71'	
			2	115.65, 115.75' - Fractures (2), horizontal, rough, stepped, open				
			1	116.1-116.25' - Fracture, 45 deg, rough, planar, tight				
			0	116.35' - Fracture, horizontal, rough, undulating, open				
			5	117.1' - Fracture, <10 deg, rough, undulating, open				
	R19-HQ 5 ft 40%	0	>10	117.5, 117.6, 117.65' - Fractures (3), horizontal, rough, planar, open	|		R18: 4 minutes	
			>10	120.2' - Fracture, horizontal, rough, undulating, open				
			NR	120.25-120.6' - Fracture zone				
				120.85' - Fracture, horizontal, rough, undulating, open				
				121.75, 121.9' - Fractures (2), horizontal, rough, undulating, open				
125	R20-HQ 5 ft 78%	45	>10	122.2-122.3' - Fracture, 45 deg, rough, undulating, open	|		R19: 5 minutes	
-82.2			>10	124.1, 124.2' - Fractures (2), horizontal, rough, undulating, open				
			1	124.2-124.35' - Fracture, vertical, smooth, planar, open				
			2	124.3, 124.7' - Fractures (2), 10 deg, rough, undulating, open				
			NR	125.0-125.6' - Fracture zone (8)				
	R19-HQ 5 ft 40%	0	>10	125.6' - Fracture, horizontal, rough, undulating, open	|		R19: 5 minutes	
			>10	125.6-125.9' - Fracture, 75 deg, rough, undulating, open				
			NR	125.9-126.05' - Fracture, 75 deg, rough, undulating, open				
				126.05-126.3' - Fracture zone				
				126.45-126.6' - Fracture zone				
130	R20-HQ 5 ft 78%	45	>10	126.55-127.0' - Fracture, vertical, rough, undulating, tight	|		SC-6 collected at 131.2-132.1'	
-87.2			1	126.75' - Fracture, horizontal, rough, undulating, open				
			2	126.75-127.0' - Fracture, 60 deg, rough, undulating, tight				
			1	130.0-130.15' - Fracture, vertical, rough, planar, open				
			NR	130.15' - Fracture, horizontal, rough, planar, open				
	R20-HQ 5 ft 78%	45	>10	130.15-130.85' - Fracture, vertical, rough, undulating, 1/4" relief	|		R20: 5 minutes	
			1	130.75' - Fracture, horizontal, rough, undulating, open				
			NR	130.8-131.0' - Fracture zone				
135								
135.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-21A	SHEET 8 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
 WATER LEVELS : 4.72 ft bgs on 3/12/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-92.2	R21-HQ 5 ft 76%	37	>10	131.0-131.2' - Fracture, vertical, rough, undulating, open	[Symbolic Log]	133.3-133.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), trace voids up to 1/16", 5-10% casts/cavities up to 3/8"x3/8", poorly fossiliferous No Recovery 133.9-135.0' Limestone 135.0-138.8' - yellowish gray, (5Y 8/1), 30% medium light gray mottling, very fine grained, moderate HCl reaction, medium strong (R3), trace voids to 1/16", 10% casts/cavities up to 2"x3/8", partial infill of cavities No Recovery 138.8-140.0' Limestone 140.0-141.8' - yellowish gray with very pale orange mottling, (5Y 7/2 with 10YR 8/3), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10% voids (up to 1/16") at 140.35-140.65', 141.05-141.3' and 141.5-141.6', no visible casts/cavities, trace small (<1/16") pyrite inclusion present throughout core but more noticeable along fractures 141.8-142.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), trace voids up to 1/16", no cavities No Recovery 142.5-145.0' Limestone 145.0-146.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium grained, mild HCl reaction, weak (R2), 10% voids (up to 1/16"), trace casts/cavities (up to 3/4"x3/8"), trace black inclusions (up to 1/16") 146.0-146.7' - Same as 145.0-146.0' except fine to medium grained, trace voids up to 1/16", trace infilled cavities 146.7-147.45' - Same as 145.0-146.0' 147.45-148.9' - pale yellowish brown with very pale orange and light gray mottling, (10YR 6/2 with 10YR 8/2 and N7), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 5% voids up to 1/16" (decreasing with depth), no visible cavities No Recovery 148.9-150.0' Bottom of Boring at 150.0 ft bgs on 5/23/2007	R21: 7 minutes	
140			1	132.3-132.7' - Fracture, 60 deg, rough, undulating, open				
-97.2			140.0	6				132.7-132.9' - Fracture, 60 deg, rough, undulating, open
				5				133.1' - Fracture, horizontal, rough, undulating, open
				NR				135.0-135.15' - Fracture zone 135.5-135.65' - Fracture, horizontal, rough, undulating, open 136.5', 137.2', 137.3' - Fractures (3), horizontal, rough, undulating, 1/4" relief 137.4' - Fracture, horizontal, rough, undulating, open
	R22-HQ 5 ft 50%	7	8	137.6' - Fracture, horizontal, rough, undulating, open, black organic staining over 75% of fracture surface	[Symbolic Log]	R22: 6 minutes		
			>10	137.9-138.0' - Fracture zone				
			>10	138.0-138.3' - Fracture zone, horizontal, rough, undulating, tight to healed, 1/2" spacing between fractures				
	R23-HQ 5 ft 78%	53	NR	140.0-140.2' - Mechanical break (2) 140.4-140.5' - Fracture, 60 deg, rough, undulating, open	[Symbolic Log]	R23: 6 minutes		
145				3			140.5' - Fracture, horizontal, rough, undulating, open	
-102.2			145.0	4			140.5-140.9' - Fracture, vertical, smooth, undulating, tight, "V" shaped	
				NR			140.65' - Fracture, horizontal, rough, undulating, open	
							140.75, 140.95' - Fracture, horizontal, smooth, planar, tight	
			>10	141.3' - Fracture, horizontal, rough, undulating, 1/8" relief	[Symbolic Log]	Total depth of hole 150.0'		
		>10	141.65', 141.8' - Fracture, 75 deg, smooth, undulating, open					
		3	141.8-142.5' - Fracture zone					
			4	145.75-145.9' - Fracture zone	[Symbolic Log]	Total depth of hole 150.0'		
		NR	146.0' - Fracture, 5 deg, rough, undulating, open					
			146.75-147.0' - Fracture zone					
150	150.0		NR	147.45' - Fracture, horizontal, rough, planar, 1/4" relief, 30% black staining (possibly pyrite) on surface	[Symbolic Log]	Total depth of hole 150.0'		
-107.2				147.8', 148.1' - Fracture, 50 deg, rough, planar, 1/4" relief, 30% black staining (possibly pyrite) on surface				
				148.35' - Fracture, horizontal, rough, undulating, tight				



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
 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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.6						10:08 Begin drilling with 2-7/8" tri-cone bit Soil sampling every 5' from 3.5' below ground surface
	3.5					
5	0.9	SS-1	3-3-3 (6)	Poorly Graded Sand With Silt (SP-SM) 3.5-4.4' - moderate yellowish brown with dusky brown, (10YR 5/4 with 5YR 2/2), wet, loose, very fine to fine grained, 10% organics, 10-15% nonplastic fines, sand is silica		
37.6	5.0					
	8.5					
10	1.1	SS-2	12-16-13 (29)	Silt (ML) 8.5-9.6' - yellowish gray, (5Y 7/2), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized material, coarse gravel-size limestone fragments (white [N9] to yellowish gray [5Y 8/1] at top of sample, strong HCl reaction), all carbonate		
32.6	10.0					
	13.5					
15	0.9	SS-3	28-78/11.5 (82")	Silt With Sand (ML) 13.5-14.4' - Same as 8.5-9.6' except hard, 25% very fine to fine sand-sized material, one coarse gravel-sized limestone fragment		
27.6	14.5					
	18.5					
	0.2	SS-4	50/4.5 (50/4.5")	Limestone Fragments 18.5-18.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, fragments to 1/2", 25% silt- and sand-sized carbonate materials similar to 13.5-14.4'		
20	18.9					



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 2 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
 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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.6						
23.5						
23.9	0.4	SS-5	50/5.5 (50/5.5")	Silt With Sand (ML) 23.5-24.0' - yellowish gray, (5Y 7/2), moist to wet, hard, nonplastic, high dilatancy, mild to moderate HCl reaction, 20% very fine to fine grain material, traces of coarse sand-sized grains, all carbonate		
25						
17.6						
28.5						
30	1.2	SS-6	20-43-36 (79)	Silty Sand (SM) 28.5-29.7' - dusky yellow, (5Y 6/4), moist to wet, very dense, fine to coarse grained, rapid dilatancy, mild to moderate HCl reaction, 47% nonplastic fines, trace fine gravel, all carbonate		
30						
12.6						
33.5	0.0	SS-7	50/0.75 (50/0.75")	No Recovery 33.5'		
35						
7.6						Driller's Remark: Chatter at 36-37'
38.5						
40	1.5	SS-8	41-31-50/5.75 (81/11.75")			
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 3 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

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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
2.6					Silty Sand (SM) 38.5-40.0' - moderate olive brown, (5Y 4/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 20-25% low plastic fines, 10% fine gravel-sized material		
43.5							
44.5	1.0	SS-9	24-50/6 (74/12")		Silt With Sand And Limestone (ML) 43.5-44.5' - dusky yellow, (5Y 6/4), wet, hard, low plasticity, rapid dilatancy, mild to moderate HCl reaction, 10-25% fine to coarse sand-sized grains (varies throughout sample), limestone lens at 43.8-43.9', organic lens 1/8" thick at 43.65'		
45 -2.4							
48.5							
49.5	1.0	SS-10	22-9-2 (11)		Silty Sand With Limestone (SM) 48.5-50.0' - moderate yellowish brown, (10YR 6/4), wet, medium dense, fine to coarse grained, mild to moderate HCl reaction, 37% low plastic fines, limestone lenses at 48.6', 48.8', 49.3'		
50 -7.4							
53.5							
55.0	1.5	SS-11	19-34-48 (82)		Sandy Silt (ML) 53.5-55.0' - moderate olive brown, (5Y 4/4), wet, hard, low plasticity, slow to rapid dilatancy, mild HCl reaction, 35-40% fine to coarse sand-sized grains, all carbonate, organic lenses (olive gray [5Y 3/4]) at 54.5-55.0'		
55 -12.4							
58.5	0.1	SS-12	50/2 (50/2")		Sandy Silt (ML) 58.5-58.7' - Same as 53.5-55.0' except with organics		
60							



PROJECT NUMBER: 338884.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
 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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.4						
63.5						
64.5	0.8	SS-13	40-50/5.5 (90/11.5")	Silt With Sand (ML) 63.5-64.3' - yellowish gray, (5Y 7/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15-25% fine to coarse sand-sized grains, light olive gray (5Y 5/2) laminations at 64.1-64.2'		
65 -22.4						
68.5	0.0	SS-14	50/1.5 (50/1.5")	No Recovery 68.5'		4" HW casing set to 70' below ground 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, (5Y 7/2 to 5Y 5/2), wet, soft, low to medium plasticity, slow to rapid dilatancy, mild HCl reaction, trace fine to medium sand-sized material, white carbonate clay stringers throughout Silty Sand With Limestone (SM) 73.6-73.8' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), wet, dense, fine to coarse grained, mild HCl reaction, 32% low plastic fines, limestone lens at 73.6', all carbonate		3/23/07, 07:58 Water level 6.6' below ground surface
75 -32.4						08:17 Resume drilling by bringing up 73.5' sample
78.5						
78.8	0.1	SS-16	50/3 (50/3")	Limestone Fragments 78.5-78.6' - dusky yellow, (5Y 6/4), mild HCl reaction, fragments to 1/2", voids over 50% of surface		
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 5 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
 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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-37.4						Driller's Remark: Slight chatter during drilling
83.5 83.7	0.1	SS-17	50/2 (50/2")	Limestone Fragments 83.5-83.6' - Same as 78.5-78.6'		
85 -42.4						
88.5						
90 -47.4	90.0	1.3	SS-18	18-28-27 (55)	Silty Sand With Limestone (SM) 88.5-89.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 20-25% nonplastic fines, 5-10% organics, 10% fine gravel-sized grains, limestone lens at 88.95', all carbonate	
93.5						
95 -52.4	95.0	1.2	SS-19	33-12-15 (27)	Limestone With Silty Sand 93.5-94.7' - moderate yellowish brown, (10YR 5/4), wet, mild to moderate HCl reaction, 60% limestone fragments to 1", 15-20% nonplastic fines, 20% fine to coarse sand, all carbonate	
98.5						Driller's Remark: Lost circulation at 96'
100	100.0	1.0	SS-20	10-8-2 (10)		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 6 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
 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 : 6.6 ft bgs on 3/23/07 START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (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		
	#	TYPE					
-57.4			6"-6"-6" (N)	Limestone With Silty Sand 98.5-99.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), mild to moderate HCl reaction, fine to coarse gravel-sized fragments to 1-1/2", soil fraction is fine to medium sand-sized grains with 32% nonplastic fines (varies in sample), limestone lens from 98.5-98.8', all carbonate		Casing advanced to 100' Driller's Remark: Slight loss of circulation at 102'	
103.5							
105	1.5	SS-21	11-14-6 (20)	Silty Sand With Limestone (SM) 103.5-105.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, medium dense, fine to coarse grained, mild HCl reaction, 20% nonplastic fines, 30% fine to coarse gravel-sized limestone fragments, all carbonate		Advancing casing to 105'	
-62.4							
108.5	0.0	SS-22	50/1.5 (50/1.5")	No Recovery 108.5' Begin Rock Coring at 109.0 ft bgs See the next sheet for the rock core log		3/23/07, 15:10 End soil sampling at 108.5' 3/23/07, 15:46 Preparing for rock coring	
110							
-67.4							
115							
-72.4							
120							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 7 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 : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
110 -67.4	R1-NQ 2.5 ft 96%	28	1	109.3' - Fracture, vertical, rough, undulating		Limestone 109.0-111.4' - light olive gray, (5Y 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), poorly fossiliferous, voids up to 1/16" over 15-20% of surface, larger cavities/fossil molds up to 1/4" x 1/2" over <5% of surface, <5% fine black inclusions No Recovery 111.4-111.5' Limestone 111.5-114.9' - Same as 109.0-111.4' except medium strong (R3), with increasing fossil content, voids up to 1/16" over 20-25% of surface, fossil molds up to 1/4" x 1/8" on 5-10% of surface No Recovery 115.0-116.5' Limestone 116.5-120.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine grained, very weak to medium strong (R1 to R3), fossiliferous with casts and molds up to 1/4" x 1/2". Voids up to 1/16" over 25% of surface, larger cavities/molds up to 1/2" x 1/2" on <5% of surface, thinly bedded No Recovery 120.6-121.5' Limestone 121.5-122.85' - light olive gray, (5Y 5/2), fine grained, weak to medium strong (R2 to R3), voids (1/16") over 15-20% of surface, moderately fossiliferous with casts up to 1/4" x 1/4", larger cavities up to 1" x 1/2" over <5% of surface, thinly bedded 122.85-122.9' - medium light gray, (N6), very fine grained, medium strong (R3), no voids/fossils/cavities 122.9-125.7' - Same as 121.5-122.85' No Recovery 125.7-126.5'	3/23/07, 16:48 Start coring Note: R1 is short run (2.5') to set stroke R1: 2 minutes Slight loss of circulation during run, driller advancing casing to 111.5' 3/23/07 End drilling for the day at 111.5' 3/24/07, 07:54 water level is 8.9' below ground surface 08:17 Begin drilling SC-1 collected as 112.8-113.5' Slight circulation loss during R2-NQ run R2: 18 minutes	
			2	109.7' - Fracture, 55 deg, smooth, undulating				
			2	110.0' - Fracture, vertical, smooth to rough, undulating				
			NR	110.7' - Mechanical break				
			2	111.15, 111.35' - Fracture (2), 70 deg, smooth to rough, undulating				
			NR	112.1' - Mechanical break				
			2	112.2' - Bedding plane, <10 deg, smooth, undulating				
			3	112.85, 113.25' - Bedding plane (2), <20 deg, rough, undulating				
	R2-NQ 5 ft 70%	52	0	113.4' - Bedding plane, <10 deg, rough, undulating				
			2	113.5, 113.9' - Mechanical break				
			NR	114.9' - Fracture, 50 deg, rough, undulating				
			NR	115.2' - Bedding plane, <20 deg, rough to smooth, undulating				
115 -72.4			4	117.05, 117.25, 117.4' - Bedding plane (3), 20 deg, rough, undulating				
			3	117.7, 117.8, 117.9' - Bedding plane (3), <10 deg, smooth, planar				
	R3-NQ 5 ft 82%	44	2	118.0, 118.75, 119.25, 120.0, 120.15' - Bedding plane (5), <10 deg, smooth, planar, infill of fine grained material at 119.25'				
			2					
			NR					
120 -77.4			5	121.95' - Bedding plane, 20 deg, rough, undulating				
			3	122.0, 122.1, 122.3, 122.5, 122.6, 122.75, 122.85, 122.9' - Bedding plane (8), <10 deg, smooth, undulating				
	R4-NQ 5 ft 84%	58	3	123.65, 123.8, 123.95' - Bedding plane (3), <10 deg, smooth to rough, undulating				
			0					
			NR					
125 -82.4			3	126.85' - Fracture, 85 deg, rough to smooth, undulating				
			1	126.95, 127.05' - Bedding plane (2), horizontal, smooth, undulating				
	R5-NQ			128.15' - Bedding plane, <10 deg, rough to smooth, undulating				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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 : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
130 -87.4	5 ft 80%	48	4	128.55, 128.75' - Bedding plane (2), horizontal, smooth, undulating	Limestone 126.5-128.7' - light olive gray, (5Y 5/2), fine grained, weak (R2), small (1/16") voids over 15% of surface, fossiliferous, fossil casts up to 1/2" x 1/4", cavities 1" x 1/2" over <5% of surface, light gray (N6) mottling at 128.15-128.7' with decrease in small voids (<1/16") to <5% 128.7-130.5' - dusky yellow, (5Y 6/4), extremely weak to very weak (R0 to R1), small (<1/16") voids over 35% of surface, highly fossiliferous No Recovery 130.5-131.5' Limestone 131.5-135.5' - light olive gray, (5Y 5/2), fine grained, weak to medium strong (R2 to R3), small (<1/16") voids over 15-30% of surface increasing with depth, larger cavities up to 1" x 1" over 10% of surface, discontinuous black organic laminae (<5%), interbed of very fine grained light olive gray (5Y 5/2) dense limestone with <5% voids (<1/16") over surface No Recovery 135.5-136.5' Limestone 136.5-139.7' - yellowish gray to light gray, (5Y 8/1 to N7), weak to medium strong (R2 to R3), small voids (<1/8") over 10-20%, generally increasing with depth, larger cavities up to 1/2" x 1" over up to 10% of surface, partial infilling of cavities with soft medium light gray (N6) material No Recovery 139.7-141.5' Limestone 141.5-141.8' - medium gray, (N5), weak to medium strong (R2 to R3), 20% small voids (<1/16") over surface, cavities up to 1/4" x 1/4" <10% of surface 141.8-143.5' - yellowish gray with light gray and brownish gray interbed layering, (5Y 7/2 with N7 and 5Y 4/2), very fine grained, strong to very strong (R4 to R5), small (<1/16") voids <5" coverage, poorly fossiliferous 143.5-144.5' - Same as 141.8-143.5' except weak to medium strong (R2 to R3), interbedded with light olive gray (5Y 5/2), highly fossiliferous layers exhibiting small voids (<1/16") over 30% of surface	Circulation loss during run, advancing casing R5: 21 minutes		
		>10		129.3, 129.7' - Mechanical break (2) 129.4' - Bedding plane, 20 deg, smooth, undulating 129.95-130.5' - Fracture zone				
	NR		131.5-131.7' - Fracture zone, 50-60 deg, intersecting fractures					
	131.5		132.4' - Bedding plane, <5 deg, smooth to rough, planar 132.7-132.8' - Fracture zone 132.9' - Bedding plane, <5 deg, smooth to rough, planar 133.1' - Bedding plane, <10 deg, rough, undulating 134.35, 134.5' - Fracture (2), 20 deg, rough, undulating 134.6' - Fracture, 70 deg, rough, undulating 135.0' - Fracture, 15 deg, smooth, planar 135.1' - Bedding plane, horizontal					
135 -92.4	R6-NQ 5 ft 80%	53	2	133.1' - Bedding plane, <10 deg, rough, undulating	Lost circulation at 135' R6: 5 minutes			
		3		134.35, 134.5' - Fracture (2), 20 deg, rough, undulating 134.6' - Fracture, 70 deg, rough, undulating 135.0' - Fracture, 15 deg, smooth, planar 135.1' - Bedding plane, horizontal				
	NR		136.8-137.05' - Fracture zone 137.25' - Bedding plane, <15 deg, rough, undulating 137.4' - Bedding plane, associated with cavity 137.95' - Fracture, 15-20 deg, rough, undulating					
	136.5		138.4-138.55' - Fracture zone 138.95' - Mechanical break 139.15, 139.45' - Bedding plane or mechanical break (2), 10-15 deg, rough to smooth, undulating					
140 -97.4	R7-NQ 5 ft 64%	36	2	138.4-138.55' - Fracture zone	R7: 8 minutes 3/24/07 End drilling for the day at 141.5' 3/25/07, 07:59 Water level 2.9' below ground surface 08:41 Resume drilling			
		0		139.15, 139.45' - Bedding plane or mechanical break (2), 10-15 deg, rough to smooth, undulating				
	NR		141.65-141.8' - Fracture zone 141.9' - Fracture, 60 deg, smooth, partial mineralization on surface, open 142.0' - Bedding plane, <5 deg, smooth, undulating, stains on surface 142.1, 142.2' - Fractures (2), 85 deg, smooth to rough, mineralization on surface 143.15, 143.55' - Bedding plane (2), <10 deg, rough to smooth, undulating 144.3' - Bedding plane, <5 deg, smooth, undulating to planar, slight staining (<20%) on fracture surface 144.5' - Bedding plane, <20 deg, smooth to rough, undulating, partially associated with organic lens 144.75' - Bedding plane, smooth, undulating 145.05-145.15' - Fracture zone 146.5-146.7' - Fracture zone					
	141.5		147.7, 147.85' - Bedding plane (2), <20 deg, smooth, undulating 147.95, 146.9' - Mechanical break					
145 -102.4	R8-NQ 5 ft 74%	35	2	143.15, 143.55' - Bedding plane (2), <10 deg, rough to smooth, undulating	R8: 14 minutes Driller's Remark: Circulation loss 100% near beginning of run R9 SC-4 collected at 147.0-147.8'			
		6		144.3' - Bedding plane, <5 deg, smooth, undulating to planar, slight staining (<20%) on fracture surface				
	NR		144.5' - Bedding plane, <20 deg, smooth to rough, undulating, partially associated with organic lens 144.75' - Bedding plane, smooth, undulating 145.05-145.15' - Fracture zone 146.5-146.7' - Fracture zone					
	146.5		147.7, 147.85' - Bedding plane (2), <20 deg, smooth, undulating 147.95, 146.9' - Mechanical break					
	R9-NQ		3	147.7, 147.85' - Bedding plane (2), <20 deg, smooth, undulating 147.95, 146.9' - Mechanical break				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 9 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 : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.4	5 ft 75%	62	1	148.15' - Bedding plane, <15 deg, smooth, undulating, associated with slightly softer zone	Limestone 144.5-145.2' - dusky yellow, (5Y 6/4), weak to medium strong (R2 to R3), 30% small voids (<1/16"), similar to interbeds 143.5-144.5' No Recovery 145.2-146.5' Limestone 146.5-150.25' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, medium strong to strong (R3 to R4), poorly to moderately fossiliferous with fossil casts/molds up to 1/2" x 1/4", small 1/16" voids over <10% of surface increasing to 35% over interval from 147.9-148.9' No Recovery 150.25-151.5' Limestone 151.5-155.8' - yellowish gray, (5Y 7/2), fine grained, weak to medium strong (R2 to R3), poorly fossiliferous, <5% small 1/16" voids over surface, fine black organic lamination from 153.9-154.3' No Recovery 155.8-156.5' Limestone 156.5-159.95' - yellowish gray, (5Y 7/2), fine grained, weak to medium strong (R2 to R3), poorly fossiliferous, <5% small (1/16") voids, interval from 159.0-159.5' is laminated with alternating colors of dusky yellow (5Y 6/4) and light olive gray (5Y 5/2), laminations are inclined 30%, olive gray material is fine grained and is medium strong to strong (R3 to R4) No Recovery 159.95-161.5' No Recovery 161.5-166.5'	R9: 7 minutes Casing advanced to 151'	
		2	148.85' - Bedding plane, <5 deg, smooth, planar				
		NR	149.95, 150.15' - Mechanical break (2)				
	151.5						
155 -112.4	R10-NQ 5 ft 86%	53	>10	151.9-152.4' - Fracture zone, smooth to rough, undulating, zone of organic layering		R10: 9 minutes	
			4	152.9, 153.25, 153.4' - Bedding plane (3), 15-20 deg, smooth to rough, undulating			
			>10	153.45' - Fracture, 65 deg, rough, undulating, medium gray infill (N5) infill on fracture face			
			1	153.55' - Fracture, 25 deg, smooth to rough, undulating, black staining on 50% of surface			
			0	153.9-154.15' - Fracture zone			
			NR	154.3' - Bedding plane, <20 deg, organic laminations throughout			
				155.25' - Bedding plane, <20 deg			
				155.6' - Mechanical break			
			1	156.6, 157.6' - Bedding plane (2), 10 deg, smooth to rough, undulating			
			3	157.8, 157.9, 158.75' - Bedding plane (3), <5 deg, planar			
160 -117.4	R11-NQ 5 ft 69%	53	2	159.0-159.5' - Bedding plane, 30 deg, smooth, planar, organic staining on 35% of surface at 159.5'		R11: 15 minutes	
			1				
			NR				
165 -122.4	R12-NQ 5 ft 0%	0	NR			R12: 2 minutes	
			7	167.3' - Bedding plane, horizontal, smooth, planar			
			2	167.5-167.7' - Bedding plane, horizontal, smooth, planar			
	R13-NQ		>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22
SHEET 10 OF 11	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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 : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS
				DESCRIPTION			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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
170 -127.4	5 ft 54%	38	NR	168.4' - Bedding plane, 10 deg, smooth, undulating 168.55' - Fracture zone, 1-3" pieces 168.6' - Bedding plane, 15 deg, rough, undulating, open	171.5, 171.6, 171.9, 172.2, 172.4, 173.0, 173.15' - Bedding plane (7), horizontal, smooth, planar	171.5	Limestone 166.5-169.2' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong to strong (R3 to R4), zones and blebs of 30-50% small (<3/16") voids alternating with fine grained material with few voids, void-rich zones occur along undulating bedding planes, larger cavities/fossil molds (up to 1/2" x 3/4") vary from <5-10% over surface No Recovery 169.2-171.5' Limestone 171.5-176.2' - light olive gray, (5Y 5/2), dense, very fine grained, moderate HCl reaction, strong (R4), thinly laminated in zones 2-4" thick alternating with zones of 25-30% small (<1/8") voids and few (<5%) larger cavities up to 1/2" diameter	R13: 8 minutes Casing advanced to 170' 3/25/07 End of drilling for the day at 171' 3/26/07, 08:05 Cleaning out hole to resume drilling
175 -132.4	R14-NQ 5 ft 94%	50	>10 >10 >10 0 NR	173.1' - Fracture, 80 deg, smooth, undulating 173.4-173.8' - Fracture zone, 3/4"-2" fragments 173.95' - Fracture, horizontal, rough, undulating, black staining on 50% of surface 174.2' - Fracture or mechanical break, 10 deg, rough, undulating 174.5' - Fracture, horizontal, rough, planar 174.8-175.2' - Fracture zone	177.75' - Fracture, horizontal, rough, undulating 177.75-178.8' - Fracture zone, 3/4"-3" fragments	176.5	No Recovery 176.2-176.5' Limestone 176.5-178.8' - light olive brown to yellowish gray, (5Y 5/6 to 5Y 7/2), strong HCl reaction, strong (R4), fossiliferous with casts/molds up to 1/2", small (1/16") voids over 10-20% of surface occurring in zones, very fine lens of rock with no voids No Recovery 178.8-181.5'	SC-5 collected at 175.4-176.2' R14: 13 minutes SC-6 collected at 176.5-177.45'
180 -137.4	R15-HQ 5 ft 46%	19	>10 NR	181.5-181.75' - Fracture zone, 1"-2" fragments 182.05' - Bedding plane 182.3-182.6' - Fracture zone, 1"-3" fragments	186.5-186.9' - Fracture zone, 3/4"-2" fragments 187.55' - Fracture, 25 deg, rough, undulating 187.85' - Bedding plane, rough, stepped 188.35-188.65' - Fracture zone	181.5	Limestone 181.5-182.6' - moderate olive brown with light olive gray zones, (5Y 3/4 with 5Y 3/4), fine to very fine grained, moderate to strong HCl reaction, strong (R4), <5% small (1/16") voids, poorly fossiliferous No Recovery 182.6-186.5'	R15: 107 minutes Stop drilling to mix mud
185 -142.4	R16-NQ 5 ft 22%	0	NR	186.5-186.9' - Fracture zone, 3/4"-2" fragments 187.55' - Fracture, 25 deg, rough, undulating 187.85' - Bedding plane, rough, stepped 188.35-188.65' - Fracture zone	188.35-188.65' - Fracture zone	186.5	Limestone 181.5-182.6' - moderate olive brown with light olive gray zones, (5Y 3/4 with 5Y 3/4), fine to very fine grained, moderate to strong HCl reaction, strong (R4), <5% small (1/16") voids, poorly fossiliferous No Recovery 182.6-186.5'	R16: 15 minutes
186.5	R17-NQ	>10 >10 >10	NR	186.5-186.9' - Fracture zone, 3/4"-2" fragments 187.55' - Fracture, 25 deg, rough, undulating 187.85' - Bedding plane, rough, stepped 188.35-188.65' - Fracture zone	188.35-188.65' - Fracture zone	186.5	Limestone 181.5-182.6' - moderate olive brown with light olive gray zones, (5Y 3/4 with 5Y 3/4), fine to very fine grained, moderate to strong HCl reaction, strong (R4), <5% small (1/16") voids, poorly fossiliferous No Recovery 182.6-186.5'	R16: 15 minutes



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22	SHEET 11 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 : 3/27/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
190 -147.4	5 ft 48%	22	NR	188.7' - Fracture, 80 deg, rough, stepped, black fine particles on fracture face	Limestone 186.5-188.9' - Same as 181.5-182.6' except increasingly mottled moderate olive brown and light olive gray, (5Y 4/4 and 5Y 5/2), fossils casts/molds up to 1/4" x 1/2", small (1/16") voids over 15% of surface, except <5% over 188.2-188.4', moderate HCl reaction, medium strong to strong (R3 to R4) rock No Recovery 188.9-191.5' Limestone 191.5-193.6' - olive brown, (5Y 4/4), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), less than 5% small (<1/16") voids on surface, highly fossiliferous, casts/molds up to 1/4" x 1/4" No Recovery 193.6-196.5'	R17: 12 minutes	
195 -152.4	R18-NQ 5 ft 42%	25	NR	192.0-193.5' - Bedding plane, numerous 2" long bedding plane 192.25' - Bedding plane, <15 deg, rough, undulating, organic staining 192.75, 193.1' - Fracture (2), 75 deg, rough, undulating, black staining		R18: 10 minutes 3/26/07, 17:31 End drilling for the day at 196.5' 3/27/07, 07:51 Water level is 3.3' below ground surface 08:05 Resume drilling	
200 -157.4	R19-NQ 5 ft 50%	28	NR	196.5, 196.6, 197.55, 197.7, 197.9, 198.1' - Fractures (6), 0-15 deg, mostly rough and undulating, semi planar, organic black staining 196.5-198.9' - Fracture zone, rough, undulating, numerous 0-25 deg. fractures over 1-2" intervals 196.85' - Fracture, 50 deg, rough, undulating, black organic staining		R19: 25 minutes 3/27/07, 09:30 Boring total depth 201.5' Water level at 3.5' below ground surface	
					Bottom of Boring at 201.5 ft bgs on 3/27/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.0 ft bgs on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
42.9			6"-6"-6" (N)			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'
5						Driller's Remark: Sand at 2.0'
37.9						Water level 4.0' below ground surface
10						Driller's Remark: Tan silt at 8.0'
32.9						
15						Driller's Remark: Weak sandy limestone at 14.3'
27.9						Driller's Remark: Harder limestone at 17'
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22A	SHEET 2 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
 WATER LEVELS : 4.0 ft bgs on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		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		
22.9			6"-6"-6" (N)				Driller's Remark: Sandy silt with weak limestone at 21.5', gravel-sized clasts
25 17.9							Driller's Remark: Weak sandy limestone at 26.0'
30 12.9							Driller's Remark: Carbonate silt at 28-29'
35 7.9	35.0 35.3	0.3	SS-1	50/4 (50/4")	Limestone Fragments 35.0-35.3' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Hard limestone at 33.5'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22A	SHEET 3 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 on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
7.9	35.0 R0-NQ 1 ft 36.0 100%	0	>10	35.0-36.0' - Fracture zone, limestone fragments	Limestone Fragments 35.0-36.0' - Same as 36.0-37.6' Limestone 36.0-37.6' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), 10-15% small (1/16" diameter) void space across surface, fossiliferous (many more molds than casts), few larger cavities (up to 3/8" diameter) No Recovery 37.6-41.0'	Begin rock core at 35.0'; 6" casing installed from surface to 10.0', HW casing to 35.0' R0: 1 minute Note: core discarded	
40 2.9	R1-NQ 5 ft 32%	9	3 >10 NR	36.0-36.1' - Fracture zone, limestone fragments 36.1' - Fracture, horizontal, rough, undulating, slight clayey infill in fossil mold on surface 36.8' - Fracture or mechanical break, 70 deg, rough, undulating to semi-planar, slightly radiused 36.9' - Fracture or mechanical break, horizontal, rough, undulating 37.2' - Mechanical break, vertical, non-planar, spall 37.5-37.6' - Fracture zone, limestone fragments			R1: 4 minutes
41.0	R2-NQ 5 ft 70%	20	0 0 5 1 NR	41.0-43.0' - Compacted silty sand (carbonate derived) 43.0, 43.1, 43.2, 43.3' - Fractures or mechanical break (4), horizontal, rough, undulating 44.0' - Fracture, >60 deg, rough, undulating, non-planar 44.3' - Fracture, horizontal, rough, with sand on surface (possible thin interbed)	Silty Sand (SM) 41.0-43.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, compacted, carbonate derived, preferentially oriented thin (1/16") dark black organic inclusions and laminations (roughly horizontal), friable Limestone 43.0-44.5' - grayish orange, (10YR 7/4), moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (more molds than casts), voids over 10% of surface (60% smaller than 1/16"; 40% up to 3/8" fossil molds), inclusions up to 1/4" light gray (N7) (fossil infilling) No Recovery 44.5-46.0' Limestone 46.0-49.1' - grayish orange, (10YR 5/4), moderate HCl reaction, very weak to weak (R1 to R2), easily broken by hand, void space across surface 15-20%, (80% smaller than 1/16", 20% larger cavities up to 1" diameter, fossiliferous (many more molds than casts), thin black organic laminae at 48.5-49.1' No Recovery 49.1-51.0'	42.5-43.0' More competent limestone beds with softer compacted silt material in between R2: 3 minutes	
45 -2.1	R3-NQ 5 ft 62%	34	3 1 >10 NR	46.3, 46.5, 46.8, 47.4' - Fractures (4), rough, undulating, mostly horizontal 48.5-49.1' - Fractures (2), 75 deg, rough, undulating		SC-1 collected at 47.4-48.5' R3: 3 minutes	
50 -7.1	R4-NQ 5 ft 100%	62	2 3 3 0	51.7, 51.9' - Mechanical break, horizontal, rough, undulating to semi-planar 52.1, 52.3, 52.9, 53.2, 53.4, 53.9' - Fractures (6), 30-40 deg, rough, undulating to semi-planar	Limestone 51.0-56.0' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, weak (R2), silty, finely laminated with dark black thin (<1/16") organic laminations, undulating non-planar bedding planes		
55							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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 on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-12.1			3	55.1' - Fracture, 60 deg, rough, semi planar slightly radiused			R4: 5 minutes	
56.0			3	55.5' - Fracture, rough, undulating		Limestone 56.0-56.5' - moderate yellowish brown, (10YR 5/4), 10-15% voids cover surface, few voids/cavities >3/16" 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 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 HCl 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' 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 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 sparse inclusions of void rich (20-25%) limestone preferentially oriented parallel to bedding planes 70.5-70.8' - grayish yellow, (5Y 8/4), medium strong (R3), fossiliferous, 15% small voids (<1/16") No Recovery 70.8-71.0'		
	R5-NQ 5 ft 70%	25	>10	55.9' - Bedding plane, horizontal, smooth, parting along organic laminae				
			1	56.5, 56.8' - Fractures (2), rough, undulating				
			>10	56.9' - Bedding plane, horizontal, smooth, 1/4" thick black organic (lignite) laminae				
60			NR	57.8-59.5' - Fracture zone, limestone fragments				R5: 4 minutes
-17.1			1	61.3, 62.15, 62.25' - Fractures or mechanical break (3), 30-60 deg, rough, undulating				
61.0			3	62.75' - Fracture, horizontal, rough, undulating				
	R6-NQ 5 ft 94%	46	1	63.0, 64.1' - Fractures (2), >80 deg, rough, undulating to semi-planar, open				
			1	64.4-64.5' - Carbonate sand interbed				
65			4	65.0, 65.2, 65.35, 65.7' - Fractures (4), horizontal, rough, undulating to planar				R6: 5 minutes
-22.1			NR					
66.0			1	66.35' - Fracture, horizontal, rough				
			1	67.0' - Fracture or mechanical break, rough, stepped				
	R7-NQ 5 ft 96%	74	3	68.0' - Fracture, >80 deg, rough, undulating to semi-planar			Possible bioturbation	
			4	69.1' - Fracture, 45 deg, rough, undulating to planar				
70			2	69.1-70.5' - Fracture, vertical, undulating, tight (possibly healed)			R7: 3 minutes	
-27.1			NR	69.7, 69.9, 70.1, 70.5' - Fractures (4), horizontal, rough, undulating, (possible bedding planes)				
71.0			1	71.8, 73.5, 74.1, 74.3' - Mechanical break (4), rough, undulating, irregular			Start drilling 6/14/07 at 08:00, depth at 71.0' Water level 3.9' below ground surface	
	R8-NQ 5 ft 96%	62	1					
			3	74.5' - Fracture, >80 deg, non-planar (spall)				
75								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	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.
-32.1			2	75.0' - Clay seam, 1/2" silty clay interbed, dark brown/black organics		Limestone 71.0-75.8' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), void space over surface varies from 10-25% (60-70% small voids <1/16" with remainder ranging from 3/16" to >3/4"), fossiliferous (many more molds than casts), void rich zone 71.5-71.8', minor clay infilling in larger (1") cavity, fine grained silty zone (no voids) 73.5-73.7', 1/2" thick organic rich black clay seam at 75.0' No Recovery 75.8-76.0' Limestone 76.0-80.0' - Same as 71.0-75.8' except fractured/fragment zones associated with higher percentage of small voids/cavities (fossil molds), organic seams (black) at 79.5' and 80.0' No Recovery 80.0-81.0' Limestone 81.0-85.2' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong (R3), fossiliferous (many more molds than casts), 10-15% small voids covering surface (90% are <1/16"; 10% are larger cavities [3/16"-3/8"]) No Recovery 85.2-86.0' Limestone 86.0-88.7' - Same as 81.0-85.2' except strong (R4), increased percentage of voids and small (<3/8") cavities, fine grained dark olive gray limestone lense at 88.5-88.7' No Recovery 88.7-91.0'	R8: 3 minutes	
76.0		NR	1	75.7' - Mechanical break, rough, undulating, irregular 76.2' - Fracture, >60 deg, rough, undulating, irregular, tight (healed)				
	R9-NQ 5 ft 80%	26	>10	77.4' - Fracture, 60 deg, slightly rough, undulating to planar				
			>10	77.6-78.5' - Fracture zone, limestone fragments				
			>10	79.1-79.3' - Fracture zone, limestone fragments, dark brownish black coating on one fragment, greasy luster on surface, tacky (organics).				
80			NR	79.8' - Clay seam, 1/2" clay infilling, dark brownish black, greasy luster, tacky (organics)				R9: 2 minutes
-37.1			>10	81.0-81.2' - Fracture zone, limestone fragments				SC-2 collected at 81.6-82.6'
	R10-NQ 5 ft 84%	54	0	81.6' - Mechanical break, horizontal, rough, undulating				
			0	84.0' - Fracture, rough, undulating, irregular				
85			2	84.5, 84.7' - Fracture, >70 deg, rough, semi-planar				
-42.1			0				R10: 7 minutes	
			NR					
	R11-NQ 5 ft 54%	12	5	86.1, 86.2, 86.3, 86.5, 86.7' - Fractures (5), 60-70 deg, rough, undulating to semi-planar, irregular, conjugate sets				
			>10	87.5-88.7' - Fracture zone, rough, limestone fragments, irregular surfaces				
			>10					
90			NR				R11: 6 minutes	
-47.1							Driller's Remark: 50% loss of circulation at 90.0-91.0'	
	R12-NQ 5 ft 68%	18	5	91.3' - Fracture, 60 deg, rough, undulating to semi-planar		Limestone 91.0-91.8' - moderate olive brown, (5Y 4/4), fine grained, mild to moderate HCl reaction, strong to very strong (R4 to R5), dense, no voids		
			3	91.5' - Fracture, horizontal, rough, undulating 91.6, 91.8, 91.9' - Fractures (3), 45 deg, rough, undulating, irregular				
			2	92.3, 92.5, 92.6, 93.0' - Fractures (4), 50-60 deg, rough, undulating and planar to semi-planar, irregular				SC-3 collected at 93.4 - 94.4'
			0	93.4' - Fracture zone, irregular, with limestone fragments				
95								



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-22A	SHEET 6 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 on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-52.1			NR		Limestone 91.8-94.4' - pale yellowish brown, (10YR 6/2), medium strong (R3), 10-15% small voids covering surface (<1/16"), few larger cavities infilled with fine grained yellowish gray (5Y 7/2) material, marbled zone of yellowish brown void-rich limestone with yellowish gray fine grained voidless limestone 94.0-94.4' (possible breccia) No Recovery 94.4-96.0'	R12: 4 minutes	
96.0			>10				
	R13-NQ 5 ft 28%	0	NR				
100			>10				
-57.1			>10				
101.0			>10				
	R14-NQ 5 ft 64%	40	2				
105			0				
-62.1			NR				
106.0			NR				
	R15-NQ 5 ft 100%	48	1				
110			3				
-67.1			1				
111.0			4				
	R16-NQ 5 ft 54%	0	1				
115			>10				
			>10				
			>10				
			NR				



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 bgs on 6/13/07 START : 6/13/2007 END : 6/14/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-72.1							
116.0							
	R17-NQ 5 ft 58%	34	3	116.3, 116.7, 116.8' - Fractures (3), horizontal, rough, undulating, irregular		Limestone 116.0-116.7' - Same as 111.0-113.7' except increasing percentage voids/cavities 3/16"-3/4" in size (up to 10% of surface), notable infilling and recrystallization in fossil molds	R16: 3 minutes
			2	117.0' - Bedding plane or fracture, horizontal, smooth, planar		116.7-117.25' - moderate yellowish brown, with pronounced bedding plane laminations, fine sand particles in fracture surface	
			1	117.25' - Sharp horizontal contact with light gray, fine grained limestone		117.25-117.8' - light gray, (N7), fine grained, strong (R4), dense, no voids	R17: 4 minutes
120				117.8' - Contact with fossil and void rich moderate yellowish brown limestone		117.8-118.9' - Same as 111.0-113.7' except large 1" fossil cast at end of core	
-77.1			NR			No Recovery 118.9-121.0'	Total depth 121.0'
121.0						Bottom of Boring at 121.0 ft bgs on 6/14/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, NWJ rods, 3-7/8 tri-cone bit 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
40.8	0.0	0.8	SS-1	1-2-2 (4)	Poorly Graded Sand With Organics (SP) 0.0-0.1' - topsoil Poorly Graded Sand (SP) 0.1-0.75' - grayish black grading to medium gray, (N2 to N5), moist, very loose, fine grained, trace nonplastic fines, organics		
5 35.8	1.5	0.5	SS-2	2-3-3 (6)	Clayey Sand (SC) 5.0-5.4' - greenish gray, (5G 6/1), moist, loose, fine grained, 40% fines, medium to high plasticity, silica sand Silty Sand (SM) 5.4-5.5' - yellowish gray, (5Y 7/2), moist, loose, fine to medium grained, 20% fines, strong HCl reaction, nonplastic fines, carbonate material		
10 30.8	5.0	1.0	SS-3	10-9-5 (14)	Silt And Limestone (ML) 10.0-11.0' - very pale orange, light olive brown to light yellow, (10YR 8/4, 5Y 5/6 to 5Y 7/6), wet, stiff, 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)
15 25.8	10.0	1.1	SS-4	10-11-14 (25)	Silt (ML) 15.0-16.05' - very pale orange, (10YR 8/2), wet, very stiff, rapid dilatancy, moderate HCl reaction, nonplastic, carbonate; trace coarse sand to fine gravel-sized		Driller's Remark: hard drilling from 14-15.0', Limestone rock fragments in cuttings
20	11.5						



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-23	SHEET 2 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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, NWJ rods, 3-7/8 tri-cone bit 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
20.8	20.0	0.9	SS-5	13-17-16 (33)	Silt With Sand (ML) 20.0-20.9' - very pale orange, (10YR 8/2), moist to wet, hard, rapid dilatancy, mild to moderate HCl reaction, 20% fine to medium grained sand, nonplastic, all carbonate		
	21.5						
25	25.0	0.9	SS-6	19-24-11 (35)	Sandy Silt (ML) 25.0-25.9' - Same as 20.0-20.9' except up to 38% sand-sized grains with carbonate material		
15.8	26.5						
30	30.0	1.4	SS-7	8-22-35 (57)	Silt With Sand (ML) 30.0-31.4' - moderate yellow, (5Y 7/6), wet, hard, 15-20% sand, nonplastic to low plasticity, rapid dilatancy, moderate HCl reaction, <1/16" thick calcite stringers, all carbonate		
10.8	31.5						
35	35.0	0.1	SS-8	50/2 (100")	Limestone Fragments 35.0-35.1' - light olive gray, (5Y 5/2), mild HCl reaction, up to 3/8" Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		
5.8	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-23	SHEET 3 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
5.8	35.0						
	R1-HQ 5 ft 68%	51	>10		Limestone 35.0-38.4' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, very weak (R1), voids <1/16" over 10-30% of surface (becoming more numerous with depth), shallow cavities covering <1% (1/16"-1/8"x3/8"), high angle (60-70 degrees) unbroken fracture zone from 37.7-38.0'	Change to HQ rock coring at 35.0' on 4/10/07 at 10:00 hours	
			0				
			1				
			0				
			NR		No Recovery 38.4-40.0'	R1: 9 minutes	
40.8	40.0						
	R2-HQ 5 ft 68%	0	NA		Silt (ML) 40.0-43.4' - dusky yellow, (5Y 6/4), wet, soft, rapid dilatancy, mild HCl reaction, sandy, carbonate material		
			NR		No Recovery 43.4-45.0'	R2: 3 minutes	
45.0	45.0						
	R3-HQ 5 ft 64%	13	2		Limestone 45.0-46.0' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, extremely weak (R0), voids <1/16" over 15-20% of surface, cavities up to 3/16"x3/16", trace mold/ casts		
			0				
			0		Silt With Sand (ML) 46.0-48.2' - dusky yellow, (5Y 6/4), wet, soft to stiff, fine grained, 15-20% sand, rapid dilatancy		
			0		No Recovery 48.2-50.0'	R3: 6 minutes	
			NR				
50.0	50.0						
	R4-HQ 5 ft 26%	9	>10		Limestone 50.0-50.45' - Same as 46.0-48.2' except with some limestone fragments		
			>10		50.45-51.3' - light olive brown, dusky yellow, (5Y 5/6 to 5Y 6/4), fine grained, mild to moderate HCl reaction, very weak (R1), laminated black organic material from 50.9-51.3', voids <1/16" over 5-10% of surface		
			NR		No Recovery 51.3-55.0'	R4: 12 minutes	
55.0	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
 WATER LEVELS : 0.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/17/2007 LOGGER : R. McComb, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-14.2	R5-HQ 5 ft 100%	30	1	55.6' - Fractures, 0- <5 deg, rough, stepped, open		Limestone 55.0-59.5' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), extremely weak rock is friable, voids <1/16" over 3-5% of surface, interval of black carbonaceous laminae up to 3/4" thick	R5: 8 minutes
			3	56.2' - Fractures, horizontal, rough, stepped, open			
			2	56.65-56.95' - Fractures, <5 deg, rough, stepped, open			
			2	57.1' - Fractures, 20-0 deg, rough, stepped			
			0	57.85-58.1' - Fractures, <5 deg, rough, stepped, open			
60	R6-HQ 5 ft 100%	38	1	58.5-58.8' - Fracture zone, 50 deg, rough, stepped, open		59.5-60.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, weak (R2), voids (<3/16") over 10-15% of surface, weak vertical fractures from 59.5-60.0', mottled 60.0-65.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 10-15% of surface becoming <1% at 63.0', fossils (casts/molds) rare to absent with depth, trace black organic material at 61.0'	R6: 7 minutes
-19.2			>10	60.6' - Fracture, rough, stepped, planar, open			
			2	61.2-61.8' - Fracture zone, stepped, undulating, open			
			2	62.35' - Fractures, 50 deg, rough, undulating, tight			
			1	62.8' - Fractures, <5 deg, rough, undulating, open			
65	R7-NQ 5 ft 100%	20	4	63.4' - 30 deg, rough, undulating, open		65.0-66.9' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to extremely weak (R1 to R0), voids <10% of surface becoming more common with depth, very friable from 56.3-66.9' 66.9-70.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak (R2), very fine grained, fine grained matrix, voids (<1/16") over 15-20% of surface, <5 cavities (3/8" diameter), bioturbation zone below 68.4'	R7: 3 minutes
-24.2			>10	63.9 - 64.0' - Fracture zone, horizontal, rough, stepped, undulating, open			
			2	65.3' - Fractures, rough, stepped, open			
			10	65.5' - Fractures, horizontal, smooth, planar, open			
			0	65.65-66.02' - Fracture zone, horizontal, rough, undulating, open			
70	R8-HQ 5 ft 96%	26	>10	66.25-66.9' - Fracture zone, 0- 90 deg, rough, undulating, various orientations		70.0-70.4' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), voids <1/16" over 10-15% of surface, trace fossil molds/casts Silt (ML) 70.4-70.65' - yellowish gray, (5Y 7/2), wet, soft, rapid dilatancy, mild HCl reaction Limestone 70.65-72.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), voids <1/16" over 10-15% of surface, trace fossil molds/casts 72.5-73.5' - Same as 70.0-70.4' except voids 5-10% of surface	SC-1 collected at 68.9-70.0'
-29.2			1	67.35' - Fractures, 50 deg, rough, stepped, open			
			4	67.60-68.5' - Fracture zone, 50-90 deg, rough, undulating, open			
			>10	68.9' - Fractures, 0-80 deg, rough, undulating			
			>10	70.0-71.05' - Fracture zone, 60 deg, rough, undulating to stepped, open			
75							



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

WATER LEVELS : 0.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/17/2007 LOGGER : R. McComb, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-34.2	R9-HQ 5 ft 100%	64	NR	10	73.2-75.5' - Fracture zone, 60 deg, rough, stepped, open	Limestone 73.5-74.8' - yellowish gray, (5Y 7/2), mild HCl reaction, extremely weak (R0), highly fractured, friable, silt and clay along fracture planes and on fragments of rock No Recovery 74.8-75.0' Limestone 75.0-76.4' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), friable along fracture planes, voids <3/16" over 50-60% of surface, 1-2 cavities (3/16"x3/16")	R9: 4 minutes	
			0	75.0-75.3' - Fracture zone, horizontal, rough, undulating, open				
			2	75.3' - Fractures, horizontal, rough, undulating, open				
			10	75.9' - Fractures, <5 deg, rough, undulating, open				
			2	77.45' - Fractures, <5 deg, rough, stepped, open				
			2	77.7' - Fractures, 60 deg, rough, undulating, tight				
80	R10-HQ 5 ft 100%	36	1	78.0-79.0' - Fractures, 60 deg, rough, stepped, open	76.4-79.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine to very fine grained, mild HCl reaction, very weak (R1), voids <3/16" over 25% to <5% of surface (decreasing with depth), >5 cavities (3/4"-2"x3/8") and 1/16"x1/16" 79.0-79.5' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), fragmented 79.5-80.0' - Same as 76.4-79.0' 80.0-82.4' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), voids over 10-15% of surface, >5 cavities up to 1-3/4"x3/4"-1-3/16", interconnected 82.4-84.3' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, mild HCl reaction, very weak (R1), voids <1/16" over 25-30% of surface, 3 to 4 cavities up to 3/8"x3/16", trace fossils molds/casts 84.3-85.0' - Same as 82.4-84.3' except with >5 cavities (3/8"x3/8"), trace fossil molds/casts 85.0-88.2' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 15-20% of surface, >3 cavities (1/16"x3/16") interconnected, trace casts/molds No Recovery 88.2-89.5' Limestone 89.5-90.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), friable, gravel-sized rock fragments with carbonaceous material over 15-20% of surface	SC-3 collected at 82.7-83.6' R10: Run time not recorded Stop drilling for the day, 4/10/07 Water level 0.5' below ground surface Resume drilling on 4/11/07 Water level 0.5' below ground surface DR: Soft at 88.2-90.0', assumed core loss from this interval R11: 6 minutes		
-39.2			5	81.1-81.3' - Fractures, <5 deg, rough, undulating, open				
			2	81.5-81.7' - Fractures, horizontal, rough, undulating, open				
			1	81.9-82.05' - Fractures, <5 deg, rough, undulating, open				
			10	82.65' - Fractures, horizontal, rough, stepped, open				
			10	83.65' - Fracture, <5 deg, rough, undulating, open				
85	R11-HQ 5 ft 74%	64	0	83.8-84.7' - Fracture, 60 deg and 70 deg, rough, stepped, open	87.25' - Fracture, rough, undulating, open, horizontal 88.15' - Fracture zone, 40 deg, rough, stepped, open	R11: 6 minutes		
-44.2			0	84.95' - Fractures, 60 deg, rough, stepped, open				
			1	87.25' - Fracture, rough, undulating, open, horizontal				
			1	88.15' - Fracture zone, 40 deg, rough, stepped, open				
			NR					
			0					
90	R12-HQ 5 ft 78%	15	>10	90.0-94.0' - Fracture zone, gravel	90.0-94.0' - Fracture zone, gravel 90.4' - Fracture zone, 60 deg, rough, stepped, open 90.8' - Fracture zone, 0-<5 deg, rough, undulating, open 91.1' - Fractures, 60 deg, rough, stepped, open 91.5' - Fractures, 70 deg, rough, stepped, open, (7-1/5" long) from 91.3-91.9' 92.1' - Fractures, 0-90 deg, rough, stepped, open from 92.1-92.7' 92.7-92.9' - Fractures, 60 deg, rough, stepped, open 93.4-93.8' - Fractures, 0-90 deg, rough, stepped, open	R12: 10 minutes		
-49.2			2	90.4' - Fracture zone, 60 deg, rough, stepped, open				
			10	90.8' - Fracture zone, 0-<5 deg, rough, undulating, open				
			10	91.1' - Fractures, 60 deg, rough, stepped, open				
			10	91.5' - Fractures, 70 deg, rough, stepped, open, (7-1/5" long) from 91.3-91.9'				
			NR					
95								



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-54.2	R13-HQ 5 ft 100%	82	2	95.4' - Fractures, horizontal, rough, stepped, open	[Symbolic Log]	Limestone 90.0-91.0' - light olive gray, (5Y 5/2), very fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1% to absent, (2-3 inches) carbonaceous laminae, 1 cavity 2-3/8"x3/8", 1 cavity 3/8"x3/16" 91.0-93.9' - yellowish, (5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16 over 25-30% of surface, several cavities (3/8"x3/8"), fragmented at bottom No Recovery 93.9-95.0' Limestone 95.0-96.9' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, weak (R2), cavities <3/8"x3/8" (many infilled), fine grained contains voids over 15-20% of surface, very fine grain rock contains less void percentage, trace fossil casts/molds. 96.9-100.0' - dusky yellow, (5Y 6/4), fine grained, very weak to weak (R1 to R2), voids <3/16" over 35-40% of surface, several cavities (1/16"x3/8"), one cavity through core, cavities more abundant with depth. 100.0-103.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, very weak (R1), voids <3/16" over 25-30% of surface, cavities (several) 3/16"x3/16", black carbonaceous laminae at 100.9' No Recovery 103.0-105.0' Limestone 105.0-109.9' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 25-30% of surface becoming less abundant with depth, cavities (>5) 3/16"x3/8" No Recovery 109.9-110.0' Limestone 110.0-115.0' - dusky yellow, (5Y 6/4), fine to very fine grained, mild HCl reaction, very weak to extremely weak (R1 to R0), becoming weaker with depth, voids <1/16" over 10-15% of surface, cavities (>5) below 114.0' (1/16"x1/8"), trace fossil mold/casts	SC-4 collected at 95.8-96.9'
			1	95.8' - Fractures, horizontal, rough, undulating, open			R13: 9 minutes
			0	96.9' - Fracture, 50 deg, rough, stepped			
			3	98.5' - Fractures, 60 deg, rough, stepped, open			
			10	98.7' - Fractures, rough, undulating, vertical 98.9' - Fractures, <5 deg, rough, undulating, open			
100 -59.2	R14-HQ 5 ft 60%	24	>10	99.15-99.4' - Fracture zone, 60-70 deg, rough, stepped	[Symbolic Log]	101.0-102.0' - 70-80 deg, 7-1/5"- 8-2/5" long 102.0-103.0' - fractures resulting in gravel-sized limestone fragments	R14: 5 minutes
			>10	99.9-100.0' - Fracture, 60-70 deg, rough, stepped, open			
			>10	100.0-101.0' - Fracture zone, 60-70 deg, rough, planar to undulating, open, some black carbonaceous staining			
			NR				
105 -64.2	R15-HQ 5 ft 98%	88	3	105' - Fractures, rough, stepped, open 105.2' - Fractures, rough, planar, open 105.3' - Fractures, 50 deg, rough, stepped, open	[Symbolic Log]	107.35-107.5' - Fractures, 30 deg, rough, stepped, open	SC-5 collected at 105.9-107.4'
			0				
			2				
			0				
			0				
110 -69.2	R16-HQ 5 ft 100%	35	NR		[Symbolic Log]	110.2' - Fractures, horizontal, rough, undulating, open 110.6-110.9' - Fracture zone, 70-0 deg, rough, stepped, open 111.0-113' - Fracture zone, horizontal, rough, undulating, open	R15: 5 minutes
			3				
			>10				
			>10				
115			1	113.15' - Fracture, horizontal, rough, undulating			R16: 7 minutes



PROJECT NUMBER: 338884.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 : 4/17/2007 LOGGER : R. McComb, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-74.2	R17-HQ 5 ft 66%	8	>10	115.0-116.0' - Fracture zone, horizontal, rough, stepped, open	[Symbolic Log]	Limestone 115.0-116.0' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, extremely weak (R0), abundant cavities (>5) up to 3/4"-2"x 3/8"-3/4", voids over 60% of surface, fossil molds/casts 116.0-117.4' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, very weak (R1), fossiliferous (molds/casts) and organized shell material 117.4-118.3' - light olive brown, (5Y 5/6), fine grained, mild HCl reaction, extremely weak (R0), friable, coarse sand to gravel-sized fragments No Recovery 118.3-120.0'	R17: 4 minutes	
>10			116.0-118' - Fracture zone, 90-<5 deg, rough, stepped, open					
>10								
>10								
120	R18-HQ 5 ft 82%	40	NR		[Symbolic Log]	Limestone 120.0-121.6' - dusky yellow, (5Y 6/4), fine grained, weak (R2), voids up to 1/16" covering 15-20%, > cavities up to 3/4-1-3/16"x3/8", fossil casts/molds 121.6-121.9' - dusky yellow, (5Y 6/4), fine grained, weak (R2), <10% voids over surface, no cavities at 121.0' 121.9-124.1' - dusky yellow, (5Y 6/4), fine grained, weak (R2), extremely weak (R0), at 122.6-123.0' No Recovery 124.1-125.0'	SC-6 collected at 123.0-124.1' R18: 6 minutes	
-79.2			5	120.2' - Fractures, horizontal, rough, undulating, open				
			4	120.3' - Fractures, 40 deg, rough, stepped, open				
			10	120.5-120.65' - Fractures, horizontal, rough, stepped, open				
			0	120.75' - Fractures, 40-60 deg, rough, stepped, open				
			0	121.05-121.4' - Fractures, <5 deg, rough, stepped, open				
125	R19-HQ 5 ft 80%	30	NR	121.55-121.85' - Fractures, horizontal, rough, planar, open	[Symbolic Log]	Limestone 125.0-129.0' - dusky yellow, (5Y 6/4), fine grained, very weak to extremely weak (R1 to R0), punctuated with thin beds up to 2-1/2" thick, fissile, 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, cavities >5 (1/16"x3/16") fossiliferous (molds/casts) and shell material, laminated from 128.8-128.9'. No Recovery 129.0-130.0'	R19: 6 minutes	
-84.2			10	122.55' - Fractures, rough, stepped, open				
			3	122.8-103.0' - Fractures, horizontal, rough, open				
			0	124.1' - Fracture, horizontal, rough, stepped, open				
			2	125.4-125.85' - Fracture zone, 0-<5 deg, rough, stepped to undulating, open				
			NR	126.1-126.7' - Fracture zone, 50 deg, rough, stepped, open				
130	R20-HQ 5 ft 78%	28	NR	126.5-126.75' - Fractures, horizontal, rough, stepped, open	[Symbolic Log]	Limestone 130.0-131.5' - Same as 125.0-129.0' 131.5-131.9' - dusky yellow, (5Y 6/4), fine to very fine grained, punctuated with thin beds of fine grained laminations with voids 131.9-133.9' - Same as 125.0-129.0' except from 133.25-133.5 (<10% voids) No Recovery 133.9-135.0'	R20: 7 minutes	
-89.2			>10	128.35' - Fractures, 30 deg, rough, tight, undulating to stepped, clay and silt				
			10	128.75' - Fractures, 10 deg, rough, undulating, clay infilling, tight, 10% of surface <1/16" thick				
			1	130.3-131.85' - Fracture zone, smooth, planar, open				
			2	131.85' - Fractures, <5 deg, rough, stepped, open				
			NR	132.85' - Fracture, rough, stepped, open				
135			133.05' - Fractures, 0-90 deg, rough, stepped, open					
			133.53' - Fractures, rough, planar, open					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-94.2	R21-HQ 5 ft 88%	38	2	135.1' - Fractures, 50 deg, smooth, undulating, open	[Symbolic Log]	Limestone 135.0-136.4' - dusky yellow, (5Y 6/4), fine grained, very weak to extremely weak (R1 to R0), trace fine grained laminations 136.4-139.4' - greenish gray, (5GY 6/1), very light gray mottled, very fine grained, strong HCl reaction, medium strong (R3), voids <3/16" over 3-5% of surface becoming more common with depth, cavity 1-3/16"-1-9/16", ovate shape (>5) becomes numerous with depth, black carbonaceous material especially along fracture plane common below 138.5', HCl reaction becoming mild with depth No Recovery 139.4-140.0' Limestone 140.0-143.1' - yellowish gray mottled with light olive gray, (5Y 7/2 with N8), very fine grained, moderate to strong HCl reaction, weak to very weak (R2 to R1), interbedded/laminae of fine grained limestone, laminations from 140.0-140.8' and 141.0-141.4', voids (<1/16") concentrated in fine grained material over 25% of surface, cavities less than <3/8", material is medium strong to strong rock (R3 to R4)	SC-7 collected at 137.25-138.05'	
>10			135.95' - Fractures, <5 deg, rough, undulating, open					
2			136' - Fracture zone, gravels					
4			136.4' - Fracture zone, 40 deg, rough, stepped, open					
>10			136.9' - Fracture zone, 60-70 deg, rough, undulating, open					
NR			137.1' - Fractures, 50 deg, rough, undulating, open					
140	R22-HQ 5 ft 100%	76	10	137.3' - Fractures, 30 deg, rough, undulating to stepped, open	[Symbolic Log]	143.1-145.0' - moderate olive brown, (5Y 4/4), mild HCl reaction, extremely weak (R0), friable, coarse grained from 143.1-143.6 becoming fine grained with depth, voids, cavities over 70-80% from 143.6, diminishing to 10-15% with depth 145.0-145.75' - light olive gray, (5Y 5/2), very fine to fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface, <5 cavities 3/16"x3/16" 145.75-147.3' - moderate olive brown, (5Y 4/4), mild HCl reaction, extremely weak (R0), voids are 70-80% of surface 147.3-150.0' - light olive gray, (5Y 5/2), very fine to fine grained, mild HCl reaction, very weak (R1), fossils (casts/molds), becoming fragmented at base, friable, weak (R2) 150.0-150.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface	R21: 9 minutes	
140.0			137.1' - Fractures, <5 deg, rough, undulating, open					
1			138.45' - Fractures, 30 deg, rough, stepped, open, dark brown to black stain over 60-70% of surface					
1			138.7' - Fractures, 80 deg, rough, stepped, open					
1			138.95' - Fractures, rough, undulating, open					
5			139.1-140.3' - Fracture zone					
145	R23-HQ 5 ft 100%	62	2	140.7' - Fractures, <5 deg, rough, undulating, open	[Symbolic Log]	147.5-148.0' - Fractures, 75 deg, rough, undulating, tight 149.3' - Fracture, 20 deg, rough, planar, open 149.9' - Fracture, vertical, rough, stepped, open 150.3-150.7' - Fractures, smooth, planar to undulating, light tan to dark staining over 20-50% surface 152.2' - Fractures, horizontal, rough, undulating, open 152.3' - Fractures, <5 deg, rough, undulating, open 152.4' - Fractures, 60 deg, rough, undulating, tight 153.3' - Fracture, 0-90 deg, rough, stepped, open	R22: 9 minutes	
145.0			141.7' - Fracture, horizontal, rough, undulating, open					
2			142.4' - Fracture, <5 deg, rough, stepped, open					
4			143.6' - Fracture, <5 deg, smooth, undulating, tight					
2			144.1-144.85' - Fractures, <5 deg, rough, undulating, open					
0			144.9' - Fractures, vertical, rough, stepped, open					
150	R24-HQ 5 ft 72%	42	1	145.75-145.85' - Fractures, <5 deg, rough, undulating, open	[Symbolic Log]	150.0-150.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface	R23: 5 minutes	
150.0			146.0-146.5' - Fractures, <5 deg, rough, undulating, open					
3			146.9' - Fractures, rough, planar, open					
0			147.3' - Fractures, <5 deg, rough, undulating, open					
1			147.5-148.0' - Fractures, 75 deg, rough, undulating, tight					
NR			149.3' - Fracture, 20 deg, rough, planar, open					
155	R24-HQ 5 ft 72%	42	3	149.9' - Fracture, vertical, rough, stepped, open	[Symbolic Log]	150.0-150.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface	SC-8 collected at 150.7-151.8'	
150			0	150.3-150.7' - Fractures, smooth, planar to undulating, light tan to dark staining over 20-50% surface				
1			3	152.2' - Fractures, horizontal, rough, undulating, open				
NR			1	152.3' - Fractures, <5 deg, rough, undulating, open				
155	R24-HQ 5 ft 72%	42	1	152.4' - Fractures, 60 deg, rough, undulating, tight	[Symbolic Log]	150.0-150.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, very weak (R1), voids over 10-15% of surface	R24: 5 minutes	
155.0			NR	153.3' - Fracture, 0-90 deg, rough, stepped, open				



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-23	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
-114.2	R25-HQ 5 ft 60%	32	>10	155.15' - Fractures, rough, undulating, open	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 1/16" over 20-25% of surface, linear-shaped cavities up to 1-3/16"x3/16" Limestone 150.7-152.2' - yellowish gray, (5Y 7/2), mottled, fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), voids over 35% of surface 152.2-153.6' - light olive brown, (5Y 7/2), very weak (R1), voids over 25-30% of surface, cavities (3/16"x3/16"), some black organic material throughout No Recovery 153.6-155.0' Limestone 155.0-155.4' - Same as 152.2-153.6' 155.4-156.0' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids/cavities absent, laminated, weak/unbroken fracture separated by overlying limestone 156.0-158.0' - light olive brown, (5Y 7/2), very weak (R1), voids over 25-30% of surface, cavities (3/16"x3/16"), some black organic material throughout No Recovery 158.0-160.0' Limestone 160.0-160.2' - light olive brown, (5Y 7/2), very weak (R1), voids over 25-30% or surface, cavities (3/16"x3/16"), some black organic material throughout 160.2-162.15' - yellowish gray, (5Y 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") 162.15-164.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to very fine grained, extremely weak 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 section No Recovery 164.0-165.0' Limestone 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 surface, >5 cavities 3/8"x 1/16", fossils (mold/cast)	R25: 5 minutes			
160				160.0			0	155.7' - Fractures, 10 deg, smooth, planar, open	
-119.2				R26-HQ 5 ft 80%			50	>10	155.8' - Fractures, rough, undulating
165									165.0	0	156.03' - Fractures, rough, stepped, open
-124.2	10	162.0' - Fracture zone, rough, predominantly horizontal undulating to stepped, open							
165	R27-HQ 5 ft 100%	26	>10	163.3' - Fracture, rough, stepped, open, horizontal, fracture connecting 163.3-163.4'	167.0-168.3' - Fracture zone, 90-0 deg, rough, undulating to stepped, open 168.3' - Fracture zone, horizontal, smooth, undulating 168.7' - Fracture zone, vertical, stepped, open 168.85' - Fracture zone, horizontal, rough, undulating, open 169.1-169.65' - Fractures, horizontal, rough, undulating, open 170.1' - Fractures, <5 deg, rough, undulating, open 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 172.0-172.2' - Fractures, <5-90 deg, rough, undulating to stepped, open 172.25-173.0' - Fractures, horizontal, intersecting angles 173.2-173.8' - Fractures, rough, undulating, vertical fracture along face of core, open	R26: 7 minutes			
165				165.0			0	163.4-163.65' - Fractures, <5 deg, undulating, smooth to rough	
-124.2				10			163.7-163.85' - Fractures		
170				170.0			0	163.85' - Fractures, horizontal, rough, undulating, open	
-129.2	R28-HQ 5 ft 92%	30	>10	165.1-165.75' - Fracture zone, 0-90 deg, rough, undulating, open	173.2-173.8' - Fractures, rough, undulating, vertical fracture along face of core, open	R27: 9 minutes			
170				170.0			0	165.7-165.75' - Fracture zone, 0-90 deg, rough, undulating, open	
-129.2				10			167.0-168.3' - Fracture zone, 90-0 deg, rough, undulating to stepped, open		
170				170.0			4	168.3' - Fracture zone, horizontal, smooth, undulating	
-129.2				3			168.7' - Fracture zone, vertical, stepped, open		
175				175.0			NR	168.85' - Fracture zone, horizontal, rough, undulating, open	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 0.5 ft bgs on 4/10/07 START : 4/9/2007 END : 4/17/2007 LOGGER : R. McComb, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-134.2	R29-HQ 5 ft 91%	60	1	173.8' - Fractures, horizontal, rough, undulating, open	[Symbolic Log]	168.0-170.0' - yellowish gray, (5Y 7/2), very fine grained, weak (R2) 170.0-174.0' - yellowish gray, (5Y 7/2), light olive gray mottled, fine to very fine grained, mild HCl reaction, weak (R2), voids up to 1/16" over 10-15%, cavities (>5) 3/16"x3/16", fossil (casts/mold) concentrated at 171.6-172.0' Limestone 174.0-174.6' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, weak (R2), laminated, voids (<1/16") <1% of surface becoming more numerous, 5-10% is brown laminae becoming thicker with depth. No Recovery 174.6-175.0' Limestone 175.0-175.3' - dusky yellow, (5Y 6/4), mild HCl reaction, extremely weak (R0), friable 175.3-176.9' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, medium strong (R3), voids confined to cavity infilling 176.9-179.55' - yellowish brown to dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over 5-10% of surface, cavities abundant in upper 0.5' (1-3/16"-1-9/16"x3/8-3/4") less frequent with depth No Recovery 179.55-180.0' Limestone 180.0-181.7' - yellowish brown to dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over 5-10% of surface, cavities (1-3/16" to 1-9/16"x3/8" to 3/4") abundant in upper 0.5' less frequent with depth 181.7-183.4' - yellowish gray mottled with pale greenish yellow, (5Y 7/2 with 10Y 8/2), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16", ovate cavities up to 3/4"-1-3/16", fossil (cast), voids 183.4-185.0' - yellowish brown to dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl reaction, weak to medium strong (R2 to R3), interbeds of limestone similar to 181.7-183.4' 185.0-186.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, extremely weak (R0), voids, cavities (up to 3/8"-3/4"x3/8") over 50-60% of surface, fossils (mold/casts)	R29: 9 minutes	
>10			173.9' - Fractures, smooth, planar, open 174.3' - Fracture, <10 deg, smooth, planar, tight, slightly inclined 175.2' - Fracture, smooth, undulating, open, sand-sized grains 176.0-177.0' - Fracture zone, 0-90 deg, undulating, smooth to rough, open					
0			178.6-178.75' - Fractures, 10 deg, smooth, planar, tight					
3			178.85' - Fractures, <5 deg, rough, undulating to stepped, open					
3			179.25-179.35' - Fractures, horizontal, smooth, planar, open					
180	R30-HQ 5 ft 100%	54	NR	179.45' - Fractures, rough, stepped, open 180.8' - Fractures, rough, undulating, open 180.9' - Fractures, <5 deg, rough, stepped, open	[Symbolic Log]	182.95' - Fracture, <5 deg, rough, undulating, open 183.0-184.0' - Fracture zone, 0-<5 deg, smooth to rough, undulating stepped, open	R30: 9 minutes	
-139.2			2	185.0-186.0' - Fracture zone, gravels, vertical orientation				
0			186.0' - Fracture zone, 0-90 deg, rough, stepped, open					
>10			186.1' - Fracture zone, vertical, rough, generally stepped to undulating					
>10			186.4' - Fracture zone, horizontal, rough, planar, open					
185	R31-HQ 5 ft 100%	26	>10	187.5' - Fracture zone, 60 deg, rough, undulating, open	[Symbolic Log]	187.5' - Fracture zone, 60 deg, rough, undulating, open 188.0-188.7' - Fracture zone, 60 deg and 70 deg, rough, undulating to stepped, open	R31: 8 minutes	
-144.2			>10	190.1' - Fractures, rough to smooth, undulating, open				
190			10	190.75' - Fractures, 10 deg, smooth, planar, open				
-149.2			>10	190.85' - Fractures, <5 deg, rough, stepped, open				
190.0			>10	191.0-191.2' - Fracture zone, 60 deg, rough, stepped, open				
195	R32-HQ 5 ft 100%	15	>10	191.4' - Fractures, 10 deg, smooth, planar, tight	[Symbolic Log]	191.7' - Fractures, 10 deg, smooth, undulating, open 192.0' - Fracture zone, 90-<5 deg, rough, stepped, open	Stopped drilling for the day 4/11/07 Resume drilling 4/12/07 Water level 0.5' below ground surface	
190			>10	191.7' - Fractures, 10 deg, smooth, undulating, open				
-149.2			>10	192.0' - Fracture zone, 90-<5 deg, rough, stepped, open				
195			>10					
195.0			>10					



PROJECT NUMBER: 338884.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 bgs on 4/10/07 START : 4/9/2007 END : 4/17/2007 LOGGER : R. McComb, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-154.2	R33-HQ 5 ft 86%	0	>10	192.25-192.4' - Fracture zone, 60 deg, rough, stepped, open, horizontal	[Symbolic Log]	186.0-188.0' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, medium strong (R3), voids <1/16" over <1% of surface 188.0-190.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, extremely weak (R0), voids, cavities (up to 3/8"-3/4"x 3/8") over 50-60% of surface, fossils (mold/casts) Limestone 190.0-190.85' - light olive brown, (5Y 4/4), fine grained, mild HCl reaction, extremely weak to very weak (R0 to R1), laminated, voids and cavities up to 2"x3/8" (coating) >5 at 190.3-190.4' becoming smaller with depth 190.85-191.4' - light olive brown, (5Y 4/4), fine grained, no to mild HCl reaction, extremely weak (R0), voids 1/16" or less over 3-5% of surface 191.4-195.0' - grayish yellow, (5Y 7/2), very fine to fine grained, very weak to extremely weak (R1 to R0), laminated from 191.4-191.9, becoming massive-bedded with depth (gravelly) with fossil mold/casts 195.0-199.3' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, very weak (R1), easily breaks along fracture plane, voids over 1-3% to absent, cavities rare <5 (3/16"x3/16"), trace laminations, trace calcareous stain No Recovery 199.3-200.0' Limestone 200.0-201.0' - pale olive, (10Y 6/2), fine grained, moderate HCl reaction, medium strong (R3), 1/4" thick zones with voids up to 1/16" 201.0-203.2' - light olive gray, (5Y 6/1), fine to medium grained, moderate HCl reaction, weak (R2), 20% voids up to 1/16", collapse breccia zone from 202.0-203.2' No Recovery 203.2-205.0' Limestone 205.0-207.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak (R2), voids to 1/16"x1/16" over 25% of surface, few cavities 1"x1/4", poorly fossiliferous (molds/casts), voids over 3-5% of surface 207.0-208.6' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, weak (R2), moderately fossiliferous molds/casts, voids over 35% of surface No Recovery 208.6-210.0'	R33: 12 minutes
>10			192.6'-195.0' - Fracture zone, various orientation from subhorizontal to very vertical, stepped to undulating, rough to smooth, open				
>10			195.0-199.5' - Fracture zone, smooth, undulating				
>10							
>10							
200 -159.2	R34-HQ 5 ft 64%	0	NR				
200.0			>10	200.0-201.0' - Fracture zone			Stopped drilling HQ on 4/12/07 Resume drilling on 4/17/07 C. Dougherty begins logging
			>10	201.0-202.0' - Fracture zone			
			>10	202.0-203.0' - Fracture zone			
			0	203.0-203.2' - Fracture zone			R34: 9 minutes
205 -164.2	R35-HQ 5 ft 72%	8	5	205.1' - Fractures, rough, undulating, horizontal, open			
205.0			7	205.5' - Fractures, horizontal, rough, undulating, open			
			>10	205.8' - Fractures, horizontal, smooth, stepped			
			>10	205.9' - Fractures, horizontal, smooth, stepped, black staining			
			NR	206.0' - Fractures, horizontal, smooth, stepped, slight black staining			
210 -169.2	R36-HQ 5 ft 90%	40	NR	206.2' - Fractures, 45 deg, rough, undulating, black staining			
210.0			>10	206.4-206.5' - Fractures, horizontal, smooth, undulating, <1/16" coating of silt size particles on surface			
			>10	206.8' - Fractures, horizontal, rough, undulating			
			5	207.0-208.6' - Fracture zone			
			3	211.0' - Fractures, 20 deg, smooth, undulating			
			3	211.2' - Fractures, horizontal, rough, undulating, brown staining, on 50% of surface			
			2	211.5-211.9' - Mechanical break, 35 deg, rough, undulating			
215	NR	212.5' - Fractures, horizontal, rough, undulating, fine to medium grain particles on surface					
215.0	NR	213.2' - Fractures, horizontal, smooth, stepped			R36: 8 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-23	SHEET 13 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-194.2	R41-HQ 5 ft 22%	>10	>10	235.0-236.1' - Fracture zone, rock fragments, irregular shape, generally 2" length or less	225.7-227.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids, casts/molds, iron staining on partings, voids <5% of surface, poorly fossiliferous No Recovery 227.5-230.0' Limestone 230.0-231.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), zone of voids over 40% of surface from 230.7-231.1' Limestone 231.9-233.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1) No Recovery 233.4-235.0' Limestone 235.0-236.1' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), fragments have 10% voids, poorly fossiliferous No Recovery 236.1-240.0' Limestone 240.0-241.3' - Same as 235.0-236.1' 241.3-242.0' - yellowish gray, (5Y 7/2), fine grained, very weak (R1), poorly fossiliferous 242.0-242.5' - light olive gray, (5Y 5/2), fine grained, medium strong (R3), poorly fossiliferous, iron staining along bedding planes, bedding planes are uneven and undulating 242.5-243.4' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), voids over 50% of surface, moderately fossiliferous (casts/molds) No Recovery 243.4-245.0' Limestone 245.0-248.0' - yellowish grey, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, very weak (R1), fractures, massive, poorly fossiliferous (casts) No Recovery 248.0-250.0' Bottom of Boring at 250.0 ft bgs on 4/17/2007	R41: 5 minutes	
240		0	NR	240.0-243.0' - Fracture zone, mostly rock fragments 240.0-243.0', with 2 pieces of core about 3" long			
-199.2	R42-HQ 5 ft 68%	>10	>10	242.7-245.9' - Fracture zone, top and bottom are 10 to 20 degrees from horizontal, respectively	R42: 6 minutes		
240		0	NR	243.0-243.1' - Fractures, horizontal, smooth, undulating, carbonate derived fine grain particle on faces of fracture, bedding plane			
245	R43-HQ 5 ft 60%	>10	>10	245.0-248.0' - Fracture zone, rock fragments	R43: 4 minutes		
-204.2		0	NR				
250							
-209.2							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
40.6	0.0	1.1	SS-1	2-2-3 (5)	Poorly Graded Sand With Silt (SP-SM) 0.0-1.1' - medium light gray, (N6), moist, loose, fine grained, no HCl reaction, 5% nonplastic fines, organics roots decreasing with depth, sand is silica		
	1.5						
5	5.0	1.1	SS-2	2-2-2 (4)	Silty Sand (SM) 5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loose, fine grained, no HCl reaction, 25% low to nonplastic fines, trace iron nodules, trace roots, sand is silica		
35.6	6.5						
10	10.0	1.0	SS-3	3-5-4 (9)	Silty Sand And Limestone (SM) 10.0-10.95' - light gray, (N7), wet, loose, very fine to fine grained, moderate to strong HCl reaction, mixed with yellowish gray (5Y 8/1) fine to medium sand sized carbonate grains, 24% fines, 30% fine to coarse gravel-sized carbonate grains, limestone fragments at bottom of sample, sand is silica		
30.6	11.5						
15	15.0	1.5	SS-4	40-49-17 (66)	Silt (ML) 15.0-16.5' - very pale orange, (10YR 8/2), wet, hard, rapid dilatancy, moderate HCl reaction, 5% gravel, trace fine grained sand, fine grained lamination, nonplastic, all carbonate		
25.6	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-24	SHEET 2 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 bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
20.6	20.0	1.5	SS-5	39-20-13 (33)	Limestone Fragments And Silt (ML) 20.0-20.5' - dusky yellow, (5Y 6/4), fine to coarse grained, moderate to strong HCl reaction, angular, limestone fragments	Casing set at 20' below ground surface	
	21.5				Silt (ML) 20.5-21.5' - Same as 15.0-16.5' except moderate to strong HCl reaction, 1/2" fragments of coarse sand to fine limestone gravel at 20.6' and 21.0', all carbonate		
25	25.0	1.1	SS-6	10-10-4 (14)	Sandy Silt (ML) 25.0-26.1' - yellowish gray, (5Y 7/2), wet, stiff, rapid dilatancy, moderate HCl reaction, 31% fine to medium grained sand, nonplastic	Drilling ends 4/18/07 Drilling resumes 4/19/07 at 07:35 hrs	
15.6	26.5						
30	30.0	1.1	SS-7	5-6-25 (31)	Silt With Sand (ML) 30.0-31.1' - Same as 25.0-26.1' except 20-25% fine to coarse grained sand	Drilling ends 4/18/07 Drilling resumes 4/19/07 at 07:35 hrs	
10.6	31.5						
35	35.0	0.6	SS-8	22-72/7 (72/7")	Silty Gravelly Sand (SM) 35.0-35.6' - pale yellowish brown, (10YR 6/2), wet, very dense, mild to moderate HCl reaction, 30% fine to coarse grained gravel, 30% low plastic fines, all carbonate	Driller's Remark: Organic material in cuttings at about 37' below ground surface	
5.6	35.6						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
0.6	40.0	1.5	SS-9	20-35-34 (69)	Sandy Silt (ML) 40.0-41.5' - pale yellowish brown, (10YR 6/2), wet, hard, rapid dilatancy, moderate HCl reaction, 25-30% fine to medium grained sand, low plastic, trace organics, all carbonate		
	41.5						
45	45.0	1.5	SS-10	3-9-27 (36)	Silty Sand (SM) 45.0-46.5' - pale yellowish brown, (10YR 6/2), wet, dense, moderate HCl reaction, 40% low plastic fines, fine to coarse grained sand, trace fine gravel, all carbonate		
-4.4	46.5						
50	50.0	1.4	SS-11	47-32-49 (81)	Sandy Silt (ML) 50.0-51.4' - light olive gray, (5Y 5/2), trace black iron mottling, moist, hard, rapid dilatancy, moderate HCl reaction, 30% fine to medium grained sand, 50% coarse grained sand in last 3.6" of sample, all carbonate		
-9.4	51.5						
55	55.0	0.4	SS-12	50/5 (50/5")	Sandy Silt (ML) 55.0-55.4' - pale to moderate yellowish brown, (10YR 6/2 to 5/4), wet, hard, moderate HCl reaction, 35% fine to medium grained sand, nonplastic, trace organics in lenses <1/16", all carbonate		
-14.4	55.4						
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
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
-19.4	60.0 60.7	0.4	SS-13	34-50/2 (50/2")	Silt (ML) 60.0-60.4' - moderate yellowish brown, (10YR 5/4), wet, hard, rapid dilatancy, moderate HCl reaction, 10-15% fine to medium grained sand, 1/16" layers of organic material at top 3.6" of samples, trace iron nodules, has a bedded appearance, irregularly laminated, all carbonate		Driller's Remark: Organics in cuttings at about 62' below ground surface
65 -24.4	65.0 66.5	1.1	SS-14	13-15-13 (28)	Silty Sand (SM) 65.0-65.7' - yellowish gray, (5Y 7/2), wet, medium dense, fine to medium grained, moderate HCl reaction, 40% low plastic fines, trace coarse grained sand at 65.4', all carbonate Silt With Sand (ML) 65.7-66.1' - yellowish gray, (5Y 7/2), wet, hard, rapid dilatancy, moderate HCl reaction, 26% fine to medium grained sand, low plastic fines, all carbonate		
70 -29.4	70.0 70.2	0.1	SS-15	50/2 (50/2")	Limestone Fragments 70.0-70.1' - light olive gray, (5Y 5/2), black iron staining Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log		
75 -34.4							
80							



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-29.4	70.0	35	0		Limestone 70.0-73.0' - light olive gray, (5Y 5/2), moderate HCl reaction, very weak (R1), voids over 70% of surface from 70.5' to 73.0', organics at 72.0' No Recovery 73.0-75.0'	Driller's Remark: Tools were bouncing when hammering, also chatter when drilling to 70' below ground surface. Driller switches to rock coring at 11:25 hrs Begin rock coring at 13:18 hours Split Spoon sample SS-15 actually advanced 70.0-70.2' R1: 6 minutes	
	3		71.2-71.6' - Fracture zone, rock fragments				
	1		71.9' - Fracture, 20 deg, rough, undulating, open, coating of carbonate derived silt 72.6' - Fracture zone				
	NR						
75	75.0	18	0		Limestone 75.0-76.6' - Same as 70.0-73.0' except cavities (2) up to 1/2" wide and 1/2" deep No Recovery 76.6-80.0'	SC-1 collected at 75.0-75.9' R2: 6 minutes	
-34.4			2	75.9-76.6' - Fracture zone			
			NR				
80	80.0	65	0		Limestone 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, cavities 3/8" in diameter over 5%, moderately fossiliferous, 1/8" organic layers at 83.2' and 84.1'	R3: 5 minutes	
-39.4			0	80.7, 80.8, 80.9, 81.4, 81.5, 81.6, 82.0, 82.3' - Mechanical break (8)			
			0				
			>10	83.0-83.3' - Fracture zone			
			>10	84.0-84.3' - Fracture zone			
85	85.0	83	0		Limestone 85.0-91.0' - Same as 80.0-85.0' except weak to medium strong (R2 to R3)	R4: 9 minutes	
-44.4			0				
			>10	87.6-88.2' - Fracture zone			
			0				
90	90.0		0				



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-49.4	R5-HQ 5 ft 60%	35	0	90.9-91.8' - Fracture zone, rock fragments, some fragments have partial (10%) coating of grayish brown (5YR 3/2) clay 92.1' - Joint, smooth, undulating, possible cavity, open	[Symbolic Log]	Limestone 91.0-93.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" over 20% of surface, solution cavity 1/2"x1.5"x3/4" deep at 92.5', 1/16" wide weathered area around edges of cavity No Recovery 93.0-95.0'	SC-2 collected at 90.0-90.9'
>10			Driller's Remark: Lost circulation at 92'				
1			R5: 9 minutes				
NR							
95 -54.4	R6-HQ 5 ft 100%	57	>10	96.8' - Joint, 60 deg, smooth, undulating, coating of carbonate derived silt, tight 97.2-98.0' - Fracture, vertical, rough, undulating	[Symbolic Log]	Limestone 95.0-99.2' - Same as 80.0-85.0' except trace organics at 97.6' 99.2-99.6' - medium light gray, (N6), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4) 99.6-104.0' - Same as 95.0-99.2'	R6: 10 minutes
1							
1							
0							
100 -59.4	R7-HQ 5 ft 80%	48	>10	100.4-100.8' - Fracture zone 101.5-101.9' - Fracture zone 102.3' - Joint, 35 deg, rough, undulating, black iron staining, open 103.8' - Joint, horizontal, rough, undulating, open	[Symbolic Log]	No Recovery 104.0-105.0'	R7: 8 minutes
>10							
1							
NR							
105 -64.4	R8-HQ 5 ft 74%	40	2	105.6, 105.9' - Fractures (2), horizontal, rough, undulating, open 107.0' - Fracture or mechanical break, horizontal 107.0-107.4, 107.7-107.9' - Fracture zone (2), horizontal, coating of carbonate derived silt 108.4' - Fracture or mechanical break, horizontal, loose	[Symbolic Log]	Limestone 105.0-108.7' - light olive gray, (5Y 5/2), very fine grained, weak to medium strong (R2 to R3), <1/16" voids over 40% of surface, moderately fossiliferous (cast and molds), color change to yellowish gray, (5Y 7/2), at 108.3' and very weak (R1) No Recovery 108.7-110.0'	R8: 5 minutes
0							
>10							
1							
110 110.0			NR				



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 METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-69.4	R9-HQ 5 ft 100%	78	0		Limestone 110.0-114.0' - Same as 105.0-108.7' except poorly fossiliferous 114.0-115.0' - dusky yellow, (5Y 6/4), fine to very fine grained, strong HCl reaction, very weak (R1), 1/16" voids over 15% of surface, poorly fossiliferous 115.0-117.0' - Same as 110.0-114.0' except <1/16" voids over 20% of surface 117.0-118.2' - moderate olive brown, (5Y 4/4), moderate HCl reaction, very weak (R1), zone of carbonate derived silt at 117.0-117.4' and 117.8-118.0' 118.2-119.5' - light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2), voids (1/16") over 20% of surface, larger voids (up to 3/8") over 5% of surface, moderately fossiliferous (molds) No Recovery 119.5-120.0' 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 medium strong (R2 to R3), voids <1/16" over 30% of surface, few large voids (3/8"x1"), moderately fossiliferous, voids oriented parallel to bedding plane at about 20 degrees, large cavity (3/8"x1-3/16") present at 122.0', laminated bedding (1/16"-1/4") below 122.5' No Recovery 123.6-125.0' Limestone 125.0-127.8' - Same as 118.2-119.5' except zone of larger (3/4"x3/8") cavities from 125.8-126.3' over 30% of surface, voids (<1/16") over 25% of surface No Recovery 127.8-130.0'	SC-3 collected at 111.4-112.4' R9: 8 minutes R10: 8 minutes Fragments from 120.4-120.4' appear to have been cored at two different angles indicating they were loose in borehole R11: 6 minutes R12: 5 minutes	
			0				
			0	112.6-112.9' - Mechanical break			
			2	113.3' - Joint, 20 deg, smooth, undulating, dark staining, loose 113.7' - Joint, 60 deg, smooth, undulating, dark staining, loose			
115			1	114.0, 114.9' - Mechanical break (2) 114.3' - Fracture zone or mechanical break 115.0-115.4' - Joint, 80 deg, rough, undulating, black iron staining on 25% of the surface			
-74.4	R10-HQ 5 ft 90%	40	1	115.5' - Mechanical break 116.3-116.5' - Mechanical break 117.0-118.1' - Fracture zone			
			0				
			>10	119.0-119.5' - Fracture zone			
			NR				
120	R11-HQ 5 ft 72%	20	3	120.4-120.7' - Fracture zone			
-79.4			3	121.3' - Fracture, 20 deg, smooth, planar, coating of carbonate derived fine sand particles on face, along bedding plane 121.5-121.8' - Fracture zone 121.7' - Fracture, 20 deg, smooth, planar, along bedding plane			
			1				
			0				
			NR				
125	R12-HQ 5 ft 56%	38	1	125.8' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt on faces, loose 126.3' - Joint or mechanical break, horizontal, rough, undulating			
-84.4			1				
			0				
			NR				
130							



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-89.4	R13-HQ 5 ft 40%	0	NA	130.0-130.7' - Fracture zone, mostly carbonate derived fine sand and silt size fragments	Carbonate Derived Silty Sand (SM) 130.0-130.7' - light olive gray, (5Y 6/1), wet, fine to medium grained, moderate to strong HCl reaction, staining, 25% silt Limestone 130.7-132.0' - light olive gray and dusky yellow, (5Y 5/2 and 5Y 6/4), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), gray and yellow areas interbedded in 1-inch beds, grey areas are medium to strong (R3 to R4) with few (1/16" or less) voids, dusky yellow areas are weak (R2) with 30% voids, light olive gray limestone increases with depth, bedding oriented from 0-10 degrees No Recovery 132.0-135.0' Limestone 135.0-137.7' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), moderately fossiliferous, (1/16") voids over 20% of surface, cavities (>3/16") and fossil molds over 10% of surface, <3/16" fragments of gray limestone included in matrix at about 2-3% from 136.3-137.5', 1" fragments 137.5'-137.7'. 137.7-139.4' - medium gray mottled yellowish gray, (N5, mottled 5Y 7/2), fine to very fine grained, mild HCl reaction, medium strong (R3), coloration surroundings and within cavities, highly fossiliferous (cavities and molds), few (<1/16") voids, cavities (up to 1.5"x2.5") over 15% No Recovery 139.4-140.0' Limestone 140.0-142.0' - Same as 137.7-139.4' except yellowish gray (5Y 7/2) at 140.7-142.0' 142.0-143.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated (crenelated in top 2.4" of section), few (<1/16") voids above 142.5', 15% voids from 142.5-148.0', few voids to 3/16" 143.0-144.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, weak (R2), laminated bedding, areas of voids (1/16") correspond to bedding No Recovery 144.6-145.0'	End drilling 4/19/07, 17:20 hrs Resume drilling 4/20/07, 07:45 hrs Driller's Remark: Water level 4' below ground surface	
135		0	>10	130.7-132.0' - Fracture zone, only rock fragments, 2"x3", breakage is mostly along bedding planes		R13: 7 minutes	
-94.4	R14-HQ 5 ft 88%	57	1	136.6' - Joint, horizontal, rough, undulating, iron staining, open	135.0-137.7' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), moderately fossiliferous, (1/16") voids over 20% of surface, cavities (>3/16") and fossil molds over 10% of surface, <3/16" fragments of gray limestone included in matrix at about 2-3% from 136.3-137.5', 1" fragments 137.5'-137.7'. 137.7-139.4' - medium gray mottled yellowish gray, (N5, mottled 5Y 7/2), fine to very fine grained, mild HCl reaction, medium strong (R3), coloration surroundings and within cavities, highly fossiliferous (cavities and molds), few (<1/16") voids, cavities (up to 1.5"x2.5") over 15% No Recovery 139.4-140.0' Limestone 140.0-142.0' - Same as 137.7-139.4' except yellowish gray (5Y 7/2) at 140.7-142.0' 142.0-143.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated (crenelated in top 2.4" of section), few (<1/16") voids above 142.5', 15% voids from 142.5-148.0', few voids to 3/16" 143.0-144.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, weak (R2), laminated bedding, areas of voids (1/16") correspond to bedding No Recovery 144.6-145.0'	R14: 11 minutes	
140		0	1	137.5' - Fracture zone or mechanical break, horizontal		R14: 11 minutes	
140		0	0				
140		0	0				
140		0	NR				
-99.4	R15-HQ 5 ft 92%	70	0	141.5' - Joint, horizontal, rough, undulating, iron staining, coating of carbonate derived fine sands on 15% of surface	137.7-139.4' - medium gray mottled yellowish gray, (N5, mottled 5Y 7/2), fine to very fine grained, mild HCl reaction, medium strong (R3), coloration surroundings and within cavities, highly fossiliferous (cavities and molds), few (<1/16") voids, cavities (up to 1.5"x2.5") over 15% No Recovery 139.4-140.0' Limestone 140.0-142.0' - Same as 137.7-139.4' except yellowish gray (5Y 7/2) at 140.7-142.0' 142.0-143.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated (crenelated in top 2.4" of section), few (<1/16") voids above 142.5', 15% voids from 142.5-148.0', few voids to 3/16" 143.0-144.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, weak (R2), laminated bedding, areas of voids (1/16") correspond to bedding No Recovery 144.6-145.0'	SC-4 collected at 143.5-144.6' R15: 9 minutes	
145		0	1			R15: 9 minutes	
145		0	0				
145		0	0				
145		0	NR				
-104.4	R16-HQ 5 ft 76%	68	0		137.7-139.4' - medium gray mottled yellowish gray, (N5, mottled 5Y 7/2), fine to very fine grained, mild HCl reaction, medium strong (R3), coloration surroundings and within cavities, highly fossiliferous (cavities and molds), few (<1/16") voids, cavities (up to 1.5"x2.5") over 15% No Recovery 139.4-140.0' Limestone 140.0-142.0' - Same as 137.7-139.4' except yellowish gray (5Y 7/2) at 140.7-142.0' 142.0-143.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated (crenelated in top 2.4" of section), few (<1/16") voids above 142.5', 15% voids from 142.5-148.0', few voids to 3/16" 143.0-144.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, weak (R2), laminated bedding, areas of voids (1/16") correspond to bedding No Recovery 144.6-145.0'	R16: 5 minutes	
145		0	0			R16: 5 minutes	
145		0	0				
145		0	0				
145		0	NR				
150							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-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
 CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-109.4	R17-HQ 5 ft 100%	92	0	153.3-153.8' - Fracture zone, fragments 1/16" to 1-9/16"	<p>Limestone 145.0-145.4' - olive gray to yellowish gray, (5Y 3/2 to 5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), very fossiliferous, voids (<1/16") over 30% of surface, larger (up to 3/8"x3/8") cavities and fossil molds over 5%</p> <p>145.4-145.7' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), few voids (<1/16")</p> <p>145.7-148.8' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), voids (<1/16") up to 50% of surface (few from 146.0-146.4' and 146.8-147.5'), cavities (up to 1" in diameter) over 5% from 147.0-148.8'</p> <p>No Recovery 148.8'-150.0'</p> <p>Limestone 150.0-155.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), thinly laminated from 152.0-153.8', voids (<1/16") over 10% of surface from 150.0-152.5', 30% voids from 152.5-154.0', trace voids (up to 3/16") and fossil molds</p> <p>155.0-156.9' - Same as 145.7-148.8'</p> <p>156.9-157.3' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate HCl reaction, medium 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</p> <p>157.3-159.5' - Same as 145.7-148.8' except weak (R2), thinly bedded (1/2"-1") friable zone from 157.6-158.2'</p> <p>No Recovery 159.5-160.0'</p> <p>Bottom of Boring at 160.0 ft bgs on 4/20/2007</p>	<p>SC-5 collected at 151.9-152.9'</p> <p>R17: 9 minutes</p>	
155			0				
-114.4			1				155.7' - Fracture, rough, undulating, iron staining on <5%, open
155.0			1				157.6-158.2' - Fracture zone
-114.4			1				1
160	R18-HQ 5 ft 90%	75	>10			R18: 5 minutes	
-119.4			0				
160	R18-HQ 5 ft 90%	75	NR			Total Depth at 160' at 09:45 hrs, 4/20/07	
-119.4							



PROJECT NUMBER: 338884.FL	BORING NUMBER: A-24A	SHEET 1 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 bgs on 04/20/07 START : 6/15/2007 END : 6/15/2007 LOGGER : J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
40.3			6"-6"-6" (N)			Blind drill to 25' Install SW casing to 10'
5 35.3						Water level obtained from boring A-24
10 30.3						
15 25.3						
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 04/20/07 START : 6/15/2007 END : 6/15/2007 LOGGER : J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
20.3							
25	25.0						
15.3		1.3	SS-1	3-5-8 (13)	Silt With Sand (ML) 25.0-26.3' - grayish orange, (10YR 7/4), moist, stiff, rapid dilatancy, mild to moderate HCl reaction, 15-20% fine to medium sand, 10% coarse sand to fine gravel-sized limestone fragments, all carbonate		
	26.5						
30	30.0						
10.3		0.9	SS-2	3-4-11 (15)	Silt With Sand (ML) 30.0-30.9' - Same as 25.0-26.3'		
	31.5						
35	35.0						
5.3	35.1	0.0	SS-3	50/1 (50/1")	No Recovery 35.0-35.1' Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		Install HW casing to 35'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
5.3	35.0 R1-NQ 1.5 ft 60%	33	1	35.72' - Fracture, 52 deg, rough, undulating, minor recrystallization, 3/16" open, rock, rubble at top of run 0.2" thick	Limestone 35.0-35.9' - pale reddish brown, (10R 5/4), very fine to fine grained, moderate HCl reaction, very weak (R1), voids up to 1/16" over 85% of surface, 10% irregular cavities (up to 9/16"x3/4"), minor recrystallization, some with fossil casts/ fossil molds, moderately fossiliferous No Recovery 35.9-36.5'	Begin NQ coring; first run 1.5' to set stroke R1: Run time not recorded SC-1 collected at 36.1-37.05'	
36.5		NR					
40 0.3	R2-NQ 5 ft 72%	63	0	37.85' - Fracture, 65 deg, rough, undulating, open 3/16"	36.5-40.1' - Same as 35.0-36.5' except fewer irregular cavities, 5% cavities, most with fossil cast/molds, cavities up to 3/16"x3/8", two larger cavities 1-3/16"x3/8", moderately fossiliferous No Recovery 40.1-41.5'	R2: 2 minutes	
			1	39.0' - Fracture, 75 deg, rough, undulating, open 1/16", minor carbonate recrystallization			
			1	39.75' - Fracture, 75 deg, rough, undulating, open 1/16"			
			NR				
41.5	R3-NQ 5 ft 30%	8	3	41.7-42.0' - Fracture (2), horizontal, smooth, undulating, open 3/16"	Limestone 41.5-43.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), voids up to 1/16" over 40% of surface. a few subangular rock (gray) clasts up to 3/16"x3/16", poorly to moderately fossiliferous casts/molds, few black organic inclusions, most 1/16"-1/8", one inclusion 1"x3/8" No Recovery 43.0-46.5'	R3: 1 minute	
			>10	42.45' - Fractures, horizontal, rough, undulating, open 3/8"			
				NR			42.75-43.0' - Fracture zone
45 -4.7	R4-NQ 5 ft 48%	15	2	46.6' - Fracture, 45 deg, rough, undulating, open	Limestone 46.5-48.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak (R0), some voids with fossil mold/casts, voids up to 1/16"x1/16" covering 100% of surface; 5% subangular, gray, rock clasts up to 3/16"x3/16", poorly to moderately fossiliferous 48.0-48.9' - Same as 41.5-43.0' except very few organic inclusions No Recovery 48.9-51.5'	R4: 1 minute	
			3	46.95' - Fracture, 35 deg, rough, undulating, open 3/4", minor carbonate recrystallization			
			2	47.7' - Fracture, horizontal, rough, undulating, open 1/16", tight			
			NR	48.0' - Fracture, horizontal, rough, undulating, open 3/8"			
50 -9.7			NR	48.35' - Fracture, horizontal, rough, undulating, open 1/16", slightly tight			
			NR	48.55' - Fracture, 50 deg, rough, undulating, open			
51.5	R5-NQ 5 ft 72%	14	2	52.0' - Fracture, 30 deg, smooth, planar	Limestone 51.5-53.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild to moderate HCl reaction, extremely weak (R0) 53.0-54.0' - Same as 51.5-53.0' except 2% black staining		
			5	52.35' - Fracture, horizontal, smooth, planar			
			3	52.6' - Fracture or mechanical break, horizontal, rough, undulating			
			3	52.7' - Mechanical break, horizontal, rough, undulating			
			0	52.95, 53.1' - Fractures (2), horizontal, rough, undulating			
55							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.0 ft bgs on 04/20/07 START : 6/15/2007 END : 6/15/2007 LOGGER : J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-14.7							
56.5			NR	53.4' - Fractures, 50 deg, rough, undulating, minor carbonate recrystallization, open 1/16" 53.7' - Mechanical break 54.45' - horizontal, rough, undulating, tight 54.95' - Fracture, <90 deg, rough, undulating 56.7' - Fractures, horizontal, rough, undulating, tight, open 1/16" 57.05' - Fractures, horizontal, rough, undulating, open 1/16" 57.4' - Fractures, horizontal, rough, undulating, open 3/8", minor black organic laminae 57.6, 57.7, 57.8' - Fractures (3), horizontal, rough, undulating, abundant black organic laminae 58.0' - Fracture, horizontal, rough, undulating, open 3/4", small black laminae		Limestone 54.0-55.1' - light brown, (5YR 6/4), fine to medium grained, mild HCl reaction, weak (R2), voids (<1/16") over 85% of surface, poorly to moderately fossiliferous, irregular voids up to 9/16" over 2% of surface No Recovery 55.1-56.5' Limestone 56.5-58.6' - moderate yellowish brown, (10Y 5/4), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 90% of surface, poorly fossiliferous, irregular cavities up to 3/16" over 10% of surface, black organic inclusions, angular, up to 3/8", black laminae prominent from 57.8-58.7'. No Recovery 58.6-61.5' Limestone 61.5-62.0' - grayish pink, (5R 8/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 50% of surface, irregular cavities up to 2" over 10% of surface, poorly fossiliferous 62.0-64.3' - moderate reddish orange, (10R 6/6), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 50% of surface, single black organic layer at 62.6', 1/16" thick; trace organics above and below. 64.3-64.9' - Same as 61.5-62.0' except more cavities, up to 9/16"x9/16" over 20% of surface. 64.9-66.35' - Same as 62.0-64.3' except more voids <1/8" over 70% of surface No Recovery 66.35-66.5' Limestone 66.5-67.0' - moderate reddish orange, (10R 6/6), fine grained, moderate HCl reaction, very weak (R1), voids over 10% of surface, trace organic black material, 66.5-67.0' non fossiliferous layer 67.0-68.0' - Same as 66.5-67.0' except poorly to moderately fossiliferous, mottled and layered areas with grayish pink limestone, weak (R2) over 5% of surface area. 68.0-68.4' - Same as 66.5-67.0' 68.4-69.3' - Same as 67.0-68.0' 69.3-70.85' - Same as 61.5-62.0' 70.85-71.5' - Same as 62.0-64.3'	R5: 3 minutes
60	R6-NQ 5 ft 42%	27					
-19.7			NR				
61.5			0				
65	R7-NQ 5 ft 97%	63	3	62.8' - Fracture or bedding plane, 10 deg, rough, undulating, open 3/8" 63.15' - Fractures, horizontal, rough, undulating, open 2" 63.5' - Fractures, 5 deg, rough, undulating, open 3/8" 63.9' - Fractures, horizontal, rough, undulating, minor recrystallization 64.15' - Bedding plane, horizontal, rough, undulating 64.8' - Bedding plane, horizontal, rough, undulating, open 3/4" 65.1' - Fractures, rough, undulating, minor recrystallization 65.7' - Fractures, 5 deg, rough, undulating 66.1' - Fracture, horizontal, rough, undulating, open 1-3/16" 66.95' - Fracture, horizontal, rough, undulating, open 3/8", minor recrystallization 67.7' - Fractures, 60 deg, rough, undulating, minor recrystallization 68.4' - Bedding plane, 5 deg, rough, undulating 69.05' - Fracture, 30 deg, rough, undulating, minor recrystallization 69.3' - Fracture, horizontal, rough, undulating, open 2" 69.7' - Fracture, horizontal, rough, undulating, minor recrystallization 70.6, 71.3' - Mechanical break (2) 72.2' - Fractures, horizontal, rough, undulating, minor recrystallization 72.5-72.9' - Fracture zone, rubble, minor recrystallization 73.35' - horizontal, rough, undulating, tight 73.5' - Fractures, 60 deg, rough, undulating, minor recrystallization			R6: 2 minutes
-24.7			2				
66.5			2				
65			NR				
66.5			1				
70	R8-NQ 5 ft 100%	80	2				
-29.7			2				
71.5			1				
70			2				
75	R9-NQ 5 ft 86%	51	>10				
			1				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 1 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
205 -163.0	R1-HQ 2.5 ft 100%	24	>10		Limestone 204.0-206.5' - yellowish gray, (5Y 7/2), very fine to medium grained, mild to moderate HCl reaction, extremely weak (R0), with areas of 1" diameter weak (R2) rock, voids over 40% of surface, trace laminations, fossiliferous, medium strong to strong (R3 to R4) from 204.0-204.2', HCl reaction 1-3 seconds 206.5-208.5' - yellowish gray, (5Y 7/2), very fine to medium grained, extremely weak to very weak (R0 to R1), 206.5-207.15': light olive gray (5Y 5/2), high organic content; slow, moderate HCl reaction, trace strong organic odor, 207.15-208.5': laminated with trace organics in laminations, <10% voids over surface No Recovery 208.5-209.0' Limestone 209.0-209.4' - yellowish gray, (5Y 7/2), very fine to fine grained, medium strong to strong (R3 to R4), voids <1/16" over <20% of surface, poorly fossiliferous, trace laminations, trace organics Sandy Silt (ML) 209.4-210.6' - yellowish gray, (5Y 7/2), moist to dry, hard, strong HCl reaction, >60% low to moderate plasticity carbonate fines, <40% fine to medium grained carbonate sand, trace H ₂ S odor No Recovery 210.6-214.0' Limestone Fragments 214.0-215.3' - yellowish gray, (5Y 7/2), slow moderate HCl reaction, weak (R2), 2-3" fragments from 214.0-214.7' decreasing to <1" from 214.7-215.3', voids 1/16-1/8" over 15-25% of surface Limestone And Limestone Fragments 215.3-219' - yellowish gray, (5Y 7/2), fine grained, slow moderate HCl reaction, extremely weak to very weak (R0 to R1), finely laminated (<1/16"), thin zone (217.0-217.1') of medium strong (R3) rock fragments, fine grained laminated material appears argillaceous No Recovery 217.8-219.0' Limestone 219.0-219.7' - Same as 215.3-217.8'	Boring AD-1 blind drilled to approximately 204 feet below ground surface before beginning sampling/logging. Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" 08/22/07 HW casing set to 204.25' below ground surface 08/23/07 Begin rock coring HQWL Use thick mud mix with 250-350 rpm rotation R1: 4 minutes 204-204.2': Probable sluff fallen to bottom of borehole during sonic advancement R2: 3 minutes R3: 6 minutes 08/26/07 Switch drill rigs and crew: Boart Longyear BL300T drill rig operated by Minnesota crew. Using HW casing previously set. Using face discharge type bit. C. Sump takes over logging. R4: 7 minutes	
206.5	R2-HQ 2.5 ft 80%	0	>10				
210 -168.0	R3-HQ 5 ft 32%	0	NR				
215 -173.0	R4-HQ 5 ft 76%	8	>10				
220 -178.0	R5-HQ 5 ft 60%	13	>5				
224.0			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
225 -183.0	R6-HQ 5 ft 56%	1	224.3' - Fracture, horizontal, rough, undulating, contact with very soft sandy silt carbonate material	[Symbolic Log]	Limestone And Silty Sand 219.7-222.0' - mild to moderate HCl reaction, with gravel-sized limestone fragments, very fine to fine grained fragments are fossiliferous (casts and molds up to 1/2" diameter over 10-15% of surface), voids (1/16-1/8") over 15-20% of surface, larger fragments and full core diameter zones medium strong to very strong (R3-R5), small fragments (<1") weak (R2) No Recovery 222.0-224.0' Limestone 224.0-226.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over <1-5% in zones, trace fossil casts/molds (<1%), larger fragments tend to be more competent, 225.6-226.1' medium strong (R3), extremely weak (R0) zones, friable, trace bedding (laminae 1/16-1/8"), recurring sequence of thin (6") more competent limestone beds separated by extremely weak very fine grained silt-sized carbonate material No Recovery 226.8-229.0' Limestone Fragments 229.0-229.2' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, weak (R2), 3/4"-2-1/2" fragments, fossiliferous with fossil molds/casts over 20% of surface, voids (1/16-1/8") over 15% of surface 229.2-229.5' - Same as 229.0-229.2' except strong (R4), thin, fine-grained bed, trace voids (1/16"), very fine (<1/32") black inclusions (possibly pyrite) Limestone 229.5-229.9' - yellowish gray, (5Y 7/2), very fine to fine grained, weak (R2), voids (1/16") over 40-50% of surface, larger cavities up to 1/2" over 5-10% Silty Sand Sized Material (SM) 229.9-231.4' - with gravel-sized very weak (R1) limestone fragments similar to 224.0-226.5' No Recovery 231.4-234.0' Limestone Fragments 234.0-234.7' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), small voids (1/16-1/8") over 10-15% of surface, trace small fossil molds (<3/8")	R6: 10 minutes	
		0	224.3-225.1' - carbonate silt with gravel sized fragments (1/4-1/2")				
		0	225.1-225.7' - Fracture zone, very weak limestone fragments 1-4"; full core piece laminated, easily parted on bedding plane fractures				
		NR	225.7-226.8' - Fracture zone, limestone material with fragments				
230 -188.0	R7-HQ 5 ft 48%	NA	229.0-229.55' - Fracture zone, limestone fragments, 3/4-2", weak (R2), fine oxidation staining on fracture surfaces	[Symbolic Log]	229.0-229.55' - Fracture zone, limestone fragments, 3/4-2", weak (R2), fine oxidation staining on fracture surfaces 229.55-230.2' - Extremely weak rock fractured into sand/gravel sized carbonate material 229.8' - Mechanical break, horizontal, rough 230.2-230.4' - Fracture zone, more competent limestone fragments, angular, fine grained, 1/4-1" diameter 230.4-231.4' - Extremely weak material, same as 229.55-230.2'	R7: 13 minutes	
		NA	229.55-230.2' - Extremely weak rock fractured into sand/gravel sized carbonate material				
		NA	229.8' - Mechanical break, horizontal, rough				
		NR	230.2-230.4' - Fracture zone, more competent limestone fragments, angular, fine grained, 1/4-1" diameter				
235 -193.0	R8-HQ 5 ft 32%	NA	234.0-234.7' - Fracture zone, limestone fragments 1/2-2" in size, weak to medium strong (R2-R3)	[Symbolic Log]	234.0-234.7' - Fracture zone, limestone fragments 1/2-2" in size, weak to medium strong (R2-R3) 234.7' - Horizontal contact with silty, sandy fine gravel-sized limestone fragments	R8: 13 minutes	
		NA	234.7' - Horizontal contact with silty, sandy fine gravel-sized limestone fragments				
		0					
		NR					
240 -198.0	R9-HQ 5 ft 36%	>10	239.0-239.7' - Fracture zone, limestone fragments 1" to 2-1/2" diameter	[Symbolic Log]	239.0-239.7' - Fracture zone, limestone fragments 1" to 2-1/2" diameter 239.7' - Fracture, horizontal, rough, undulating, chipped fracture face 240.0, 240.4' - Mechanical break (2), horizontal, smooth, planar	R9: 8 minutes	
		2	239.7' - Fracture, horizontal, rough, undulating, chipped fracture face				
		8	240.0, 240.4' - Mechanical break (2), horizontal, smooth, planar				
		NR					
244.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 3 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
245 -203.0	R10-HQ 5 ft 50%	20	>10	244.0-244.6' - Mechanical break, 1-2" Limestone core pieces and fragments, mostly horizontal, rough, undulating fracture faces; extremely weak rock	[Symbolic Log]	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, extremely weak (R0), finely laminated, all carbonate material No Recovery 235.6-239.0' Limestone 239.0-240.8' - yellowish gray, (5Y 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 weak -R1) No Recovery 240.8-244.0' 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 fossil molds (<1/2"), light olive gray (5Y 5/2) thinly laminated zones up to 1/4" thick spaced 1-2" apart over 244.6-245.1' No Recovery 246.5-249.0' Limestone 249.0-249.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), pitted surface, <1/16" dark brown laminations, many with 1/2" relief 249.4-251.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl 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" 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 fine black inclusions (<1/16") over 1-2% No Recovery 251.9-254.0' Limestone 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 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'	244.0': Slightly improved recovery/RQD after mixing new batch of mud
			3	244.6, 245.1' - Bedding plane (2), horizontal, rough, undulating, fractures on intact core pieces			R10: 8 minutes
			>10	245.2, 245.9' - Fractures or mechanical break (2), rough, undulating, very weak rock			
			NR	245.9-246.2' - Fracture zone, 1/4-3/4" fragments (very weak) 246.2-246.5' - Fractures (2), rough, undulating, on either end of single core piece of very weak (R1) limestone			
250 -208.0	R11-HQ 5 ft 58%	24	3	249.4' - Fracture, 10 deg, rough, undulating 249.5' - Fracture or mechanical break, 60-70 deg, rough, undulating	[Symbolic Log]	250.0': Not re-circulating mud R11: 10 minutes	
			>10	249.6' - Fracture, horizontal, rough, undulating, contact with finer grained limestone			
			4	249.6-250.4' - Fracture zone, limestone fragments 1/2-3/4" thick up to 3" diameter			
			NR	250.4, 250.9' - Fractures or mechanical break (2), horizontal, rough, undulating 251.1' - Disk-shaped discontinuity with finer grained limestone below, brown staining on surface			
255 -213.0	R12-HQ 5 ft 96%	35	>10	251.2, 251.35' - Bedding plane (2), horizontal, bedding plane fractures	[Symbolic Log]	R12: 8 minutes	
			>10	251.4' - Fracture, 10 deg, rough, undulating, stepped, crosses bedding planes			
			>10	254.0-254.7' - Fracture zone, 30% limestone fragments 1/2-3/4" in size, single 4" half core diameter with vertical rough undulating fracture or mechanical break, remaining fragments 1-2" diameter			
			2	255.1' - Fracture, horizontal, rough, undulating			
			>10	255.4' - Fracture or mechanical break, horizontal, rough, undulating, stepped, 1/2" bedding plane parting			
			NR	255.6-255.8' - Fracture zone, 1/2" thick bedding plane parting 255.8, 256.2' - Bedding plane (2), horizontal, smooth, bedding plane partings			
260 -218.0	R13-HQ 5 ft 44%	0	2	256.2-256.6' - Fracture zone, similar to 255.6-255.8'	[Symbolic Log]	R13: 7 minutes	
			>10	256.9, 257.1' - Bedding plane (2), horizontal, rough, bedding plane partings			
			NR	257.8' - Fracture or mechanical break, 70-80 deg 257.9-258.4' - Fracture zone, fragments 1-2" in length			
			NR	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			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 4 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
265 -223.0	R14-HQ 5 ft 0%	0	NR		Limestone 259.0-261.2' - Same as 254.0-258.8' except extremely weak (R0), fractured during drilling process into silty sand/gravel-sized material No Recovery 261.2-269.0'	264.0': Driller's Remark: No loss of torque Tag bottom of hole at 268.5' Bit clear Mud pump on low (6 - 8 gallons per minute) Sand-sized limestone material in previous run - possible washout	
269.0							
270 -228.0	R15-HQ 5 ft 32%	0	NR		Limestone Fragments 269.0-269.8' - yellowish gray, (5Y 7/2), mild HCl reaction, fine to medium gravel-sized fragments range in size from 1/4-2", fragments exhibit voids (1/16-1/8") over 10-25% of surface, cavities (up to 3/4") variable from trace to 15% Clayey Silt (ML) 269.8-270.0' - slow strong HCl reaction		
274.0						R15: 11 minutes	
275 -233.0	R16-HQ 5 ft 62%	0	NR		Limestone 270.0-270.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), medium density, thinly bedded (1-2") with fine laminations (<1/16") between beds, voids (1/16") up to 30% in discrete horizontal zones 1/2" thick No Recovery 270.6-274.0' Limestone 274.0-275.8' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over 5% of surface concentrated in discrete horizontal zones (bedding plane fractures) Limestone Fragments 275.8-276.1' - very fine grained, with 1" thick bed of greenish gray (5G 6/1) limestone, very strong (R5), numerous cavities up to 7/8" on one side of bed (cannot determine bed orientation) Limestone 276.1-277.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, medium strong (R3), voids (1/16") over 15% of surface, larger cavities up to 1" over 10-15% of rock No Recovery 277.1-279.0'	R16: 10 minutes	
279.0							
280 -238.0	R17-HQ 5 ft 34%	0	NR			R17: 13 minutes	
284.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 5 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
285 -243.0	R18-HQ 5 ft 82%	22	>10	284.0-285.65' - Fracture zone, 70% fragments 1-3" in size, 30% 1/2-1" in size, thinly bedded (1/4" thick) smaller fragments; fragments exhibit bedding plane partings	Limestone Fragments 279.0-280.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (1/16") over surface, fossil molds and casts over 10-15% surface of most fragments, 90% of fossil molds <3/8" in longest 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 fractures No Recovery 280.7-284.0' Limestone 284.0-284.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), HCl reaction on fresh (powdered) surface Limestone Fragments 284.3-284.7' - yellowish gray, (5Y 7/2), fine grained, weak (R2), very mild HCl 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, (5Y 7/2 and N7), fine grained, 50% fragments exhibit thin bedding plane partings (1/4-1/2" thick), light gray clayey seam at 284.7-285.0' Limestone 285.7-288.1' - light gray, (N7), very fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), mostly weak (R2), with thin zones of weaker (R1) material, voids (1/16-3/16") over 10-15% of surface, larger cavities/fossil molds up to 1/2" diameter over 15-20% of surface No Recovery 288.1-289.0' Limestone And Limestone Fragments 289.0-291.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction on powdered surface, weak to medium strong (R2 to R3), voids (1/16-1/8") over 15-25% of surface, trace cavities/fossil molds (up to 1/2"), extremely weak (R0) fractured soft material 290.4-290.7': silty, sandy gravel-sized limestone material No Recovery 291.1-294.0'	284.0-286.5': Note core barrel plugged after coring 2.5 feet. Pulled barrel and core, then cored second 2.5 feet with clean barrel. Upper portion of second run indicates material fell out of 1st run (cored twice). Combined cores for 5 foot interval. R18: combined run time: 15 minutes R19: 11 minutes SC-1 collected at 294.0-294.91' R20: 8 minutes R21: 11 minutes	
			>10	285.65' - Fracture, 5 deg, smooth, with black staining			
			>10	286.1' - Fracture or mechanical break, horizontal, rough, undulating			
			3	286.1-286.4' - Fracture zone, 1/2-2" fragments			
			NR	286.4' - Fractures, 45 deg, rough, undulating, intersecting fracture set (end of full core diameter limestone)			
289.0			NR	286.85' - Fracture or mechanical break, 45 deg, rough, undulating			
			>10	287.3' - Fracture, 45 deg, rough, undulating			
290 -248.0	R19-HQ 5 ft 42%	7	>10	287.7' - Fracture, 5 deg, rough, undulating, soft material			
			>10	287.9' - Fracture, horizontal, rough, undulating, stepped (1/4" relief)			
			NR	289.0-289.15' - Fracture zone, fragments 3/4" to 1-1/2"			
			NR	289.15' - Silty sand material on fracture surface of full core diameter limestone piece			
			NR	289.6' - Fracture, 10 deg, undulating, very rough			
294.0			NR	289.7-290.1' - Fracture zone, fragments 1-3" in size			
			1	290.15-290.4' - Fractures (2), horizontal, rough, undulating, fractures on both of ends of single core diameter limestone			
295 -253.0	R20-HQ 5 ft 58%	18	>10	290.4-290.7' - Fracture zone, 3/4-1" fragments with soft sandy material			
			>10	290.7-291.1' - Fractures, undulating, partial full core diameter limestone rock; vertical fracture surfaces intersected by 45 deg fracture set			
			NR	294.95' - Fracture, 45 deg, rough, undulating			
			NR	294.95-296.9' - Fracture zone, 2-3" fragments to 296.0' then rock becomes extremely weak and fractures into silt, sand, and fine gravel sized pieces (<3/4")			
299.0			2	299.25, 299.8' - Fractures or mechanical break (2), horizontal, rough, undulating, soft material			
300 -258.0	R21-HQ 5 ft 78%	29	1	300.3' - Fracture, horizontal, with loose material; top of dark black (organic) silt clay seam (1" thick)			
			>10	301.1' - Fractures (2), rough, undulating, vertical and horizontal intersecting fractures, possible mechanical break			
			>10	301.1-301.4' - Fracture zone, gravel sized limestone fragments (1/4-3/4") with silty sandy fines			
			NR	301.7' - Fractures, vertical, rough, undulating, intersecting fracture set in 3-1/2" core piece			
304.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
305 -263.0	R22-HQ 5 ft 91%	9	>10	301.9-302.9' - Fracture zone, silty sandy material with gravel sized (1/4-3/4") limestone fragments (25%) >10 304.0-304.7' - Fracture zone, extremely weak silt-sized material >10 305.1, 305.2, 305.35, 305.7' - Fractures or mechanical break (4), horizontal, slightly rough to smooth, weak rock, possible bedding planes 2 305.7-305.9' - Fragments (1/2-1") 1 305.9-306.5' - Fracture zone, extremely fractured zone slightly healed (intact core piece) NR 306.5-307.0' - Fracture zone, 1-3" fragments		Limestone And Limestone Fragments 294.0-295.2' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), strong HCl reaction, extremely weak to very weak (R0 to R1), intact core from 294.0-294.9': finely laminated with darker laminae (1/16" thick) spaced 1/2-1" apart Limestone Fragments 295.2-296.2' - Same as 294.0-295.2' except voids (1/16-1/8") over 5-10% of surface, trace cavities up to 1/2" diameter 296.2-296.9' - Same as 294.0-295.2' except moderate HCl reaction, extremely weak (R0), fractured into silty sandy gravel-sized material 25% gravel / 75% coarse to fine-grained silt and sand-sized particles No Recovery 296.9-299.0' Limestone 299.0-300.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), fragments with preferred horizontal orientation (yellowish gray) with fine grained light olive gray matrix material, fragments up to 1" in longest dimension, finely laminated Clay (CL) 300.3-300.5' - dark black, no HCl reaction, finely laminated, organic	R22: 12 minutes	
310 -268.0	R23-HQ 5 ft 76%	22	>10	307.3, 307.6, 307.9, 308.0' - Fractures (4), horizontal, rough, undulating, partially stepped (1/4" relief) 1 309.0-310.3' - Fracture zone, 3/4-3" fragments 2 310.9, 311.2, 311.4, 312.1, 312.4, 312.6' - Fractures or mechanical break (6), horizontal, rough, undulating 3 NR		299.0-300.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), fragments with preferred horizontal orientation (yellowish gray) with fine grained light olive gray matrix material, fragments up to 1" in longest dimension, finely laminated Clay (CL) 300.3-300.5' - dark black, no HCl reaction, finely laminated, organic	R23: 11 minutes	
315 -273.0	R24-HQ 5 ft 94%	20	>10	314.0-316.5' - Fracture zone, 1-3" limestone fragments >10 >10 2 316.8' - Fracture, 45 deg, rough, undulating >10 317.0' - Fracture, 50 deg, rough, undulating, tight 2 317.5' - Fracture or mechanical break, horizontal, rough, undulating NR 317.5-317.8' - Fracture zone, silty material with gravel sized fragments (3/4")		300.5-301.9' - yellowish gray, (5Y 7/2), fine grained, extremely weak (R0), dark gray/black blebs covering 5-10% of surface, dark brown staining on few fracture surfaces 301.9-302.9' - Same as 300.5-301.9' except fractured into silt and gravel-sized limestone fragments No Recovery 302.9-304.0' Limestone 304.0-307.8' - yellowish gray, (5Y 7/2), fine grained, slow strong HCl reaction, extremely weak to weak (R0 to R2), with dark gray blebs up to 1/2" in size	R24: 8 minutes	
320 -278.0	R25-HQ 5 ft 82%	37	>10	318.1' - Fracture, 15 deg, rough, undulating >10 318.3' - Fracture or mechanical break, horizontal, rough, undulating >10 319.3, 319.4, 319.6, 319.7, 319.85' - Fractures (5), horizontal, rough, undulating, bedding plane partings 2-4" 2 320.2-321.8' - Fracture zone NR 321.8' - Contact with competent limestone 322.1' - Fracture, horizontal, stepped, (1/4" relief) 322.7' - Fracture or mechanical break, horizontal, rough, undulating		307.8-308.55' - light olive gray, (5Y 5/2), strong HCl reaction, medium strong (R3), sharp contact with yellowish gray limestone above, finely laminated 307.8-307.9', voids 1/16" over 30-40% of surface, few larger cavities up to 3/8" (<2%) No Recovery 308.55-309.0'	R25: 9 minutes	
324.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 7 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
325 -283.0	R26-HQ 5 ft 14%	0	>10		Limestone 309.0-311.5' - yellowish gray, (5Y 7/2), weak (R2), very strong HCl reaction, voids (1/16-1/8") variable 10-30% of surface concentrated in zones preferentially oriented along horizontal bedding planes 311.5-312.1' - Same as 309.0-311.5' except pale yellowish brown, (10YR 6/2) 312.1-312.8' - Same as 309.0-311.5' No Recovery 312.8-314.0' Limestone 314.0-318.7' - Same as 309.0-311.5' except more fragmented, color becoming pale yellowish brown (5YR 5/2) at 317.0' No Recovery 318.7-319.0' Limestone 319.0-321.8' - pale yellowish brown with zones of yellowish gray, (5Y 5/2 with 5Y 7/2), strong HCl reaction, very weak (R1), grading to fractured material 320.2-321.8', voids (1/16") over 25-30% of surface, trace cavities up to 3/8" 321.8-323.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), finely laminated (1/16") 321.8-322.2' No Recovery 323.1-324.0' Limestone Fragments 324.0-324.2' - very light gray, (N8), fine grained, strong HCl reaction, strong to very strong (R4 to R5), voids/fossil molds (1/16-3/16") over 15-20% of surface Fractured Limestone 324.2-324.7' - yellowish gray, fine grained, very strong HCl reaction, extremely weak (R0), with fine gravel-sized limestone fragments (1/4-1/2"), dark brown organic material (<2%) No Recovery 324.7-329.0' Sandy Silt To Gravelly Silt (ML) 329.0-329.4' - yellowish gray, (5Y 7/2), moist, moderate to strong HCl reaction, >50% silt with <50% limestone fragments as sand to gravel-sized fraction Limestone 329.4-330.4' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), trace fossil fragments, strong organic odor	Driller's Remark: No loss of torque during drilling; wash out fine soft material possible R26: 10 minutes	
330 -288.0	R27-HQ 5 ft 70%	19	>10		329.0-329.4', 330.4-331.15', 331.7-331.95' - Silt intervals 329.6, 329.95, 330.4, 331.15, 331.5, 331.7, 331.95' - Bedding plane fractures, mechanical breaks, or silt contacts (7), <10 deg, smooth to rough	C. Sump and R. Bitely logging R27: 7 minutes	
335 -293.0	R28-HQ 5.5 ft 100%	55	3		334.25, 334.6, 334.85, 335.15, 335.45, 335.65, 335.9, 336.25, 337.5, 338.3, 338.65' - Fractures (11), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to <1/2" open	R28: 9 minutes SC-2 collected at 338.6-339.4'	
340 -298.0	R29-HQ 4.5 ft 100%	53	4		336.5' - Mechanical break	6" of R29 at end of R28 run; adjust R28 to 5.5' and R29 to 4.5' to accommodate	
			1		339.9, 340.1' - Fractures (2), <10 deg, smooth, undulating, bedding plane fractures or mechanical breaks 340.1-340.75' - Fracture zone, rough, undulating, gravel sized fragments <3" diameter 341.35, 341.5, 341.65, 343.65' - Fractures or mechanical break (4), <10 deg, rough, undulating, bedding plane fractures or mechanical breaks, tight to open <1/2" 342.25-342.3' and 343.15-343.45' - Clay seams and silt seams	R29: 7 minutes	



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
345 -303.0	R30-HQ 5 ft 100%	77	1	344.4, 345.25, 345.5, 345.75, 346.0, 346.5, 346.75, 348.3' - Fractures (8), 40 deg, bedding plane fractures or mechanical breaks, smooth to rough, undulating	Sandy To Gravelly Silt (ML) 330.4-331.15' - Same as 329.0-329.4' Limestone 331.15-331.7' - Same as 329.4-330.4' Sandy To Gravelly Silt (ML) 331.7-331.95' - Same as 329.0-329.4' Limestone 331.95-332.5' - Same as 329.4-330.4' No Recovery 332.5-334.0' Limestone 334.0-339.5' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, very weak to medium strong (R1 to R3), voids <1/16" over <30% of surface, highly variable, trace bedding plane of 30 deg, trace bedding plane 40 deg, trace inclusion clasts 339.5-340.05' - very light gray to yellowish gray, (N8 to 5Y 8/1), very fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), highly variable, increasing organic laminations with depth to mildly to moderately competent organic lens, olive gray to dark gray (5Y 4/1 to N3), very fine to fine grained, extremely weak (R0), no apparent HCl reaction on organic material, mild reaction on limestone in section, 10-20% limestone probably due to boxing, limestone same as 340.05-344.0' 340.05-344.0' - Same as 339.5-340.5' except strong HCl reaction, very weak to weak (R1 to R2), trace voids <1/16" intermittent over surface, trace laminated organics, variable hardness, variable grain sizes, trace fossil structure, trace mottled coloration, silt seam at 342.25-342.3' and clay seam at 343.15-343.45', carbonate derived, friable, nonplastic silts and moderately to highly plastic clays 344.0-349.0' - very light gray with yellowish gray mottling, (N8 and 5Y 8/1), very fine grained, moderate to strong HCl reaction, very weak to medium strong (R1 to R3), trace voids <1/16" over surface, trace fossil casts, few cavities <1"x1/4" 349.0-350.3' - yellowish gray, (5Y 8/1), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), few cavities <1"x1/4"	Driller's Remark: 100% circulation J. Burkard and C. Sump logging SC-3 collected at 344.4-345.25' 08/29/07 16:30 Stop drilling AD-1 for shift. Remove core barrel for geophysical logging R30: 7 minutes 09/05/07 10:00 Start drilling at the beginning of the shift R31: 8 minutes R32: 7 minutes R33: 7 minutes	
			4				
			2				
			0				
			1				
350 -308.0	R31-HQ 5 ft 94%	50	2	349.6, 349.8' - Mechanical break (2), 10-30 deg, rough, undulating			
			>10	350.2-351.7' - Fracture zone, rough, undulating, multiple breaks with sharp angular fragments, no visible orientation			
			>10				
			1				
			0	352.7' - Fracture, 70-80 deg, rough, undulating, tight			
355 -313.0	R32-HQ 5 ft 100%	95	NR				
			1				
			2	354.6, 355.2, 356.0, 356.5, 357.5, 358.2, 358.7, 358.8' - Mechanical break (8), horizontal to 10 deg, rough to smooth, undulating			
			1				
			3				
360 -318.0	R33-HQ 5 ft 90%	60	2	359.7, 359.8, 361.2, 361.9, 362.0, 362.5, 363.1' - Mechanical break (7), horizontal to 15 deg, rough to smooth, undulating			
			>10	360.3-360.7' - Horizontal bedding plane followed by a fracture zone composed of very weak (R1) rock fragments			
			2				
			4				
			1	362.7-363.1' - Fracture, 70-80 deg, rough, undulating, trace stain			
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
365 -323.0	R34-HQ 5 ft 98%	35	1 5 >10 2 2	364.5, 365.0, 365.3, 365.6, 365.9, 366.3, 367.3, 367.6, 368.3' - Mechanical break (9), horizontal to 10 deg, rough to smooth, undulating 364.6-366.5' - Silt-size particle infill 366.5-367.0' - Fracture zone, angular fragments up to 1/2"x1" in size	350.3-351.0' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), <1/16" thick laminar bedding planes 351.0-351.7' - yellowish gray transition to pale blue, (5Y 7/2 to 5B 6/2), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), visible casts and molds 351.7-353.7' - yellow gray, (5Y 8/1), fine grained, mild HCl reaction, very weak to weak (R1 to R2), no casts or molds No Recovery 353.7-354.0' Limestone 354.0-358.4' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), fine to medium grained, mild to moderate delayed HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), <1/16" voids cover 20-50% of surface, solution cavities 1/8"x1" 358.4-359.0' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong delayed HCl reaction, weak to medium strong (R2 to R3), <1/16" voids covering <5% of surface 359.0-361.3' - very pale orange, (10YR 8/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), trace voids 1/16" on surface, mildly fossiliferous (casts and molds), 360.4' undulating bedding plane 1/4" thick, dark yellowish brown (10YR 4/2) 361.3-362.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong delayed HCl reaction, contains silt-sized particles between breaks 362.4-363.5' - grayish yellow, (5Y 8/4), fine to medium grained, strong HCl reaction, solution cavities 1/8"x1/2" No Recovery 363.5-364.0' Limestone 364.0-364.6' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, delayed HCl reaction, very weak to weak (R1 to R2), 1/16" voids cover 10-20% of surface, few cavities 1/4"x1/2" 364.6-366.5' - dusky yellow, (5Y 6/4), very fine to fine grained, delayed mild to strong HCl reaction, very weak to weak (R1 to R2), laminar bedding 1/8" planes throughout the section	Driller's Remark: loss of circulation at 366.8' R34: 7 minutes	
370 -328.0	R35-HQ 5 ft 96%	55	1 >10 1 >10 >10	369.7, 370.3, 371.4' - Fractures (3), horizontal to 40 deg, rough to smooth, undulating, no stain, no infill 370.7-370.9' - Fracture zone, with clay size particle infill 372.4-373.4' - Fracture zone, top of zone along a smooth bedding plane, bottom section is rough and undulating		R35: 7 minutes	
375 -333.0	R36-HQ 5 ft 100%	67	>10 3 2 1 1	374.2-374.5' - Fracture zone, no visible orientation, gravels 1/2", angular to subangular 375.3-376.1' - Fracture, 80 deg, rough, undulating, 9-9/16" length visible 375.5, 375.7, 376.1, 377.6, 378.3' - Fractures or mechanical break (5), horizontal, rough, undulating 376.8' - Fracture or mechanical break, horizontal, smooth		T. Borton and J. Burkard logging R36: 5 minutes	
380 -338.0	R37-HQ 5 ft 82%	60	>10 >10 3 1 NR	379.2-379.4' - Fracture zone, subangular fragments, 1" length or less 379.9' - Fracture or mechanical break, horizontal, smooth 380.1-380.6' - Fracture zone, subangular fragments, 1" length or less, no visible orientation between fractures 380.1' - Fracture, horizontal, rough, undulating 380.6' - Fracture, 35 deg, rough 381.0' - Fracture, <5 deg, rough, undulating 381.2, 381.7' - Fractures (2), horizontal, rough, undulating 382.7' - Fracture, 50 deg, rough, undulating		SC-4 collected at 381.7-382.8' R37: 5 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
385 -343.0	R38-HQ 5 ft 74%	13	>10 1 >10 >10 NR	<p>384.0-385.0' - Fracture zone, rough, undulating, no visible orientation, angular fragments up to 1" length</p> <p>385.3' - Fracture or mechanical break, horizontal, rough, undulating, 20% of fractured plane stained black</p> <p>385.8-387.7' - Fracture zone, no visible orientation, angular fragments up to 2" in length</p>	<p>366.5-368.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (molds and casts), two casts at 368.4' (bivalve crinoids, 1"), solution cavities 1/4"x1"</p> <p>No Recovery 368.9-369.0' Limestone</p> <p>369.0-372.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to very fine grained, strong HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), 369.0-370.2': 1/16" voids 20-40% of surface, 370.2-372.3': 1/16" voids covering up to 0-10% of surface</p> <p>372.3-373.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), moderately fossiliferous (casts and molds), solution cavities 1/2"x1" in size</p> <p>No Recovery 373.8-374.0' Limestone</p> <p>374.0-378.5' - transitions from grayish yellow to dusky yellow, (5Y 8/4 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 10-20% of surface, moderately fossiliferous (casts and molds)</p> <p>378.5-379.0' - bluish white, (5B 9/1), fine grained, delayed strong HCl reaction, weak (R2), voids to <1/16" over 30-50% of surface</p> <p>379.0-380.6' - yellowish gray, (5Y 8/1), fine to medium grained, delayed moderate to strong HCl reaction, very weak to weak (R1 to R2), planar laminations, trace fossils</p> <p>380.6-383.1' - Same as 378.5-379.0' except yellowish gray, (5Y 7/2)</p> <p>No Recovery 383.1-384.0' Limestone</p> <p>384.0-385.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, weak (R2), voids to <1/16" over 20-30% of surface</p> <p>385.0-386.0' - light bluish gray, (5B 7/1), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), trace organics</p>	R38: 6 minutes		
390 -348.0	R39-HQ 5 ft 90%	48	>10 1 4 3 3 NR	<p>389.4' - Fracture zone, no visible orientation, subangular fragments up to 1/2" length</p> <p>389.9' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>390.5' - Fracture, horizontal, smooth, possible mechanical break</p> <p>391.0, 391.1' - Fractures (2), horizontal, smooth, bedding plane parting</p> <p>391.5, 391.8, 392.0, 392.3, 392.4' - Fractures (5), horizontal, smooth, undulating</p> <p>393.1, 393.2' - Fractures (2), horizontal, smooth, undulating, bedding plane parting</p> <p>393.3' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>394.3, 394.4, 394.7' - Fractures (3), horizontal, smooth, bedding plane parting</p> <p>395.0, 395.2' - Fractures (2), horizontal, rough, undulating</p> <p>395.4-395.7' - Fracture zone, no visible orientation, subangular fragments up to 1"</p> <p>395.9' - Fracture, horizontal, rough</p> <p>396.2' - Fracture, <5 deg, rough, undulating</p> <p>396.6, 396.8, 397.8' - Fractures (3), horizontal, rough, undulating</p>	<p>398.4' - Fracture, horizontal to 10 deg, smooth, undulating</p> <p>399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating</p> <p>399.9' - Fracture, horizontal, smooth, undulating</p> <p>400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting</p> <p>400.6' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>401.0' - Fracture or mechanical break, horizontal, smooth, undulating</p> <p>401.8, 402.1' - Fractures (2), horizontal, smooth, undulating</p>	R39: 7 minutes		
395 -353.0	R40-HQ 5 ft 100%	43	3 >10 2 2 3	<p>395.0, 395.2' - Fractures (2), horizontal, rough, undulating</p> <p>395.4-395.7' - Fracture zone, no visible orientation, subangular fragments up to 1"</p> <p>395.9' - Fracture, horizontal, rough</p> <p>396.2' - Fracture, <5 deg, rough, undulating</p> <p>396.6, 396.8, 397.8' - Fractures (3), horizontal, rough, undulating</p>	<p>398.4' - Fracture, horizontal to 10 deg, smooth, undulating</p> <p>399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating</p> <p>399.9' - Fracture, horizontal, smooth, undulating</p> <p>400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting</p> <p>400.6' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>401.0' - Fracture or mechanical break, horizontal, smooth, undulating</p> <p>401.8, 402.1' - Fractures (2), horizontal, smooth, undulating</p>	0.2' of core believed to be recovered from R39		
400 -358.0	R41-HQ 5 ft 74%	37	4 3 2 1 NR	<p>399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating</p> <p>399.9' - Fracture, horizontal, smooth, undulating</p> <p>400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting</p> <p>400.6' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>401.0' - Fracture or mechanical break, horizontal, smooth, undulating</p> <p>401.8, 402.1' - Fractures (2), horizontal, smooth, undulating</p>	<p>398.4' - Fracture, horizontal to 10 deg, smooth, undulating</p> <p>399.2, 399.4, 399.6' - Fractures (3), <10 deg, rough, undulating</p> <p>399.9' - Fracture, horizontal, smooth, undulating</p> <p>400.1, 400.2' - Fractures (2), horizontal, rough, undulating, bedding parting</p> <p>400.6' - Fracture or mechanical break, horizontal, rough, undulating</p> <p>401.0' - Fracture or mechanical break, horizontal, smooth, undulating</p> <p>401.8, 402.1' - Fractures (2), horizontal, smooth, undulating</p>	R40: 7 minutes		
404.0						R41: 5 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 11 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
405 -363.0	R42-HQ 5 ft 100%	60	2	404.3' - Fracture, <5 deg, rough, undulating	[Symbolic Log]	386.0-387.7' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild to moderate HCl reaction, weak (R2), layered organics, laminae visible, voids to 1/16" over 20-30% of surface, possible cross bedding No Recovery 387.8-389.0' Limestone 389.0-391.5' - very pale orange, (10YR 8/2), fine to medium grained, delayed mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 0-10% of surface 391.5-393.5' - yellowish gray, (5Y 8/1), fine to medium grained, delayed mild to moderate HCl reaction, very weak (R1), trace surface voids (<1/16"), 393.1': chert lens 0.05" No Recovery 393.5-394.0' Limestone 394.0-395.2' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl reaction, very weak (R1), <1/16" voids over 0-5% of surface 395.2-396.8' - Same as 394.0-395.2' except fine to medium grained, moderate to strong HCl reaction, voids to <1/16" over 10-20% of surface 396.8-399.8' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 20-30% of surface 399.8-402.7' - Same as 395.2-396.8' except yellowish gray, (5Y 8/1), fine grained, delayed strong HCl reaction No Recovery 402.7-404.0' Limestone 404.0-407.4' - yellowish gray, (5Y 8/1), fine to medium grained, delayed strong HCl reaction, very weak (R1), voids up to <1/16" over 0-5% of surface 407.4-409.4' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, weak (R2), trace voids <1/16", fine scale laminar and planar bedding 409.4-410.45' - yellowish gray with undulating laminae of olive gray, (5Y 8/1 and 5Y 4/1), fine to medium grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids to <1/16" over 0-5% of surface, delayed HCl reaction but strong reaction when pulverized, undulating laminations	0.3' of core placed in box with R41 Mechanical break at bottom of 0.3' is horizontal and smooth SC-5 collected at 404.75-405.55' R42: 10 minutes
410 -368.0			1	404.9, 405.7' - Fractures or mechanical break (2), horizontal, smooth			
			2	406.4' - Fracture, <10 deg, rough, undulating			
			3	406.7' - Fracture, 20 deg, rough, undulating			
			5	407.0' - Fracture, horizontal, smooth, undulating 407.2' - Fracture, horizontal, smooth			
415 -373.0	R43-HQ 5 ft 72%	40	>10	407.7-407.9' - Fracture, horizontal, rough, undulating, fine to very fine grained	[Symbolic Log]	R43: 10 minutes	
			1	408.0' - Fracture, <5 deg, rough, undulating			
			>10	408.3' - Fracture, 10 deg, rough, undulating			
			1	408.7' - Fracture, horizontal, rough, undulating			
420 -378.0	R44-HQ 5 ft 88%	18	NR	408.9' - Fracture or mechanical break, <10 deg, rough, undulating, bedding plane parting	[Symbolic Log]	R44: 8 minutes	
			>10	409.0' - Fracture or mechanical break, <10 deg, smooth, undulating			
			>10	409.3' - Fracture zone, horizontal orientation of fragments up to 1-3/16"			
			>10	409.6' - Fracture, horizontal, smooth, bedding plane parting			
			NR	410.4' - Fracture or mechanical break, horizontal, rough, undulating			
			NR	411.1-411.5' - Fracture zone, no visible orientation, one fragment 2-3/8", most <1-3/16", subangular, silty clay size, fine to very fine fill			
424.0	R45-HQ 5 ft 42%	17	>10	411.9' - Fracture, horizontal, smooth, undulating	[Symbolic Log]	Driller did not note a change in drilling patterns (no given reason for low recovery) R45: 10 minutes	
			1	412.5' - Fracture or mechanical break, 5 deg, rough, undulating			
			>10	414.3-414.6' - Fracture zone, no visible orientation, fragments up to 2-3/8", subangular, silt/clay intermixed with limestone fragments			
			>10	414.9-415.0' - Fracture zone, no visible orientation, fragments up to 5/8", subangular			
			NR	415.4' - Fracture, horizontal, rough, undulating, lithologic discontinuity			
424.0	R45-HQ 5 ft 42%	17	>10	416.0, 416.05, 416.1, 416.2, 416.35' - Fractures (5), horizontal, rough, undulating, bedding plane partings	[Symbolic Log]	R45: 10 minutes	
			>10	416.5' - Mechanical break			
			>10	416.8-416.9' - Fracture zone, no visible orientation, fragments up to <5/8", subangular to angular			
			NR	417.4' - Fracture, <5 deg, rough, undulating, trace fill			
424.0	R45-HQ 5 ft 42%	17	NR	417.8-418.1' - Fracture zone, no visible orientation, fragments up to 1-7/8", trace fine to very fine grained fill	[Symbolic Log]	R45: 10 minutes	
424.0	R45-HQ 5 ft 42%	17	NR	419.0-419.9' - Fracture zone, no visible orientation, fragments up to 2-3/8", subround, fine to very fine fill	[Symbolic Log]	R45: 10 minutes	
424.0	R45-HQ 5 ft 42%	17	NR	419.9' - Fracture, 10-20 deg, smooth	[Symbolic Log]	R45: 10 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 12 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
425 -383.0	R46-HQ 5 ft 88%	>10	>10		410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild HCl reaction, very weak (R1), trace voids <1/16" No Recovery 412.6-414.0' Limestone 414.0-414.5' - Same as 410.45-412.6' 414.5-415.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 10-20% of surface Silty Clay (CL-ML) 415.3-415.9' - dark greenish gray transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained, no HCl reaction, extremely weak (R0) Limestone 415.9-418.4' - yellowish gray, (5Y 8/1), fine to medium grained, very weak (R1), moderate to strong HCl reaction where pulverized No Recovery 418.4-419.0' Limestone 419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, clays are very fine to fine grained, extremely weak (R0), no HCl reaction, medium plasticity Limestone 419.9-421.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl reaction, weak to medium strong (R2 to R3), <1/16" voids on 10-20% of surface No Recovery 421.1-424.0' Limestone 424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on surface 10-20% Clayey Gravel (limestone Fragments) (GC) 424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction, extremely weak (R0), fine to medium grained limestone gravels, <1/2" Limestone 425.55-426.2' - yellowish gray, (5Y 8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	424.4': Man-made break	
>10		>10	420.2-420.6' - Fracture zone, <10 deg at 420.2', no visible orientation elsewhere; fragments up to 2-3/8", mostly smaller varying sizes, trace dark brown-black staining 424.7-424.9' - Fracture zone, no visible orientation, subangular fragments up to <5/8", fine to very fine grained fill 425.3-425.5' - Fracture zone, no visible orientation, fragments up to 1-3/16", angular, trace very fine fill 425.8-426.2' - Fracture zone, large fragments up to 3", possible multiple mechanical breaks 426.4-427.0' - Fracture zone, fragments up to 4", subangular to angular, multiple mechanical breaks during extraction 427.2' - Mechanical break 427.5' - Fracture, horizontal, smooth, bedding plane parting 427.8-428.4' - Fracture zone or mechanical break, fragments up to 3", trace dark gray/blue staining 429.5' - Fracture, horizontal, smooth, undulating, bedding plane parting 430.1-430.2' - Fracture zone, no visible orientation, fragments up to 1-3/16", trace fine to very fine infill 430.7' - Fracture, horizontal, smooth, undulating, bedding plane parting 430.85' - Fracture, 80 deg, rough, undulating 431.0' - Fracture, horizontal, smooth, bedding plane parting 431.5' - Fracture, 45 deg, rough, undulating, fragments of quartz up to 1/2", angular to subangular 431.9-433.0' - Fracture zone, no visible orientation, fragments up to 2", angular, trace fine to very fine fill 433.4, 433.6' - Fractures or mechanical break (2), horizontal, bedding plane parting, trace black staining 434.0' - Fracture, horizontal, smooth, undulating 434.5' - Fracture or mechanical break, <10 deg, smooth 435.1-435.5' - Fracture or mechanical break, 45-50 deg, rough, stepped 436.3' - Fracture, horizontal, smooth, trace fill 436.5, 436.6' - Fractures (2), 20-30 deg, rough, undulating, large solid fragment 1-3/16" in between 437.1-437.6' - Fracture zone, no visible orientation, fragments up to 2-3/8", angular to subangular, trace amounts of very fine fill 437.6-438.1' - Fracture, 80 deg, rough, undulating 438.1' - Fracture, horizontal, smooth, bedding plane parting 438.4' - Fracture or mechanical break, 40 deg, rough, undulating			R46: 12 minutes	
>10		1				429.5' and 429.8': Man-made breaks Only able to obtain 4.0' run due to core blockage	
>10		>10					R47: 12 minutes
NR		NR					
430 -388.0	R47-HQ 4 ft 100%	1	>10		410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild HCl reaction, very weak (R1), trace voids <1/16" No Recovery 412.6-414.0' Limestone 414.0-414.5' - Same as 410.45-412.6' 414.5-415.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 10-20% of surface Silty Clay (CL-ML) 415.3-415.9' - dark greenish gray transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained, no HCl reaction, extremely weak (R0) Limestone 415.9-418.4' - yellowish gray, (5Y 8/1), fine to medium grained, very weak (R1), moderate to strong HCl reaction where pulverized No Recovery 418.4-419.0' Limestone 419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, clays are very fine to fine grained, extremely weak (R0), no HCl reaction, medium plasticity Limestone 419.9-421.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl reaction, weak to medium strong (R2 to R3), <1/16" voids on 10-20% of surface No Recovery 421.1-424.0' Limestone 424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on surface 10-20% Clayey Gravel (limestone Fragments) (GC) 424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction, extremely weak (R0), fine to medium grained limestone gravels, <1/2" Limestone 425.55-426.2' - yellowish gray, (5Y 8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	R46: 12 minutes	
>10		46	429.5' and 429.8': Man-made breaks Only able to obtain 4.0' run due to core blockage				
>10		>10				R47: 12 minutes	
>10		>10					SC-6 collected at 435.3-436.2'
NR		NR				R48: 20 minutes	
435 -393.0	R48-HQ 6 ft 100%	2	>10		410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild HCl reaction, very weak (R1), trace voids <1/16" No Recovery 412.6-414.0' Limestone 414.0-414.5' - Same as 410.45-412.6' 414.5-415.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 10-20% of surface Silty Clay (CL-ML) 415.3-415.9' - dark greenish gray transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained, no HCl reaction, extremely weak (R0) Limestone 415.9-418.4' - yellowish gray, (5Y 8/1), fine to medium grained, very weak (R1), moderate to strong HCl reaction where pulverized No Recovery 418.4-419.0' Limestone 419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, clays are very fine to fine grained, extremely weak (R0), no HCl reaction, medium plasticity Limestone 419.9-421.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl reaction, weak to medium strong (R2 to R3), <1/16" voids on 10-20% of surface No Recovery 421.1-424.0' Limestone 424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on surface 10-20% Clayey Gravel (limestone Fragments) (GC) 424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction, extremely weak (R0), fine to medium grained limestone gravels, <1/2" Limestone 425.55-426.2' - yellowish gray, (5Y 8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	R46: 12 minutes	
>10		2	429.5' and 429.8': Man-made breaks Only able to obtain 4.0' run due to core blockage				
>10		2				R47: 12 minutes	
>10		1					SC-6 collected at 435.3-436.2'
NR		NR				R48: 20 minutes	
440 -398.0	R49-HQ 5 ft 46%	>10	>10		410.45-412.6' - yellowish gray, (5Y 7/2), fine to medium grained, delayed mild HCl reaction, very weak (R1), trace voids <1/16" No Recovery 412.6-414.0' Limestone 414.0-414.5' - Same as 410.45-412.6' 414.5-415.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate HCl reaction, very weak (R1), voids to <1/16" over 10-20% of surface Silty Clay (CL-ML) 415.3-415.9' - dark greenish gray transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained, no HCl reaction, extremely weak (R0) Limestone 415.9-418.4' - yellowish gray, (5Y 8/1), fine to medium grained, very weak (R1), moderate to strong HCl reaction where pulverized No Recovery 418.4-419.0' Limestone 419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, clays are very fine to fine grained, extremely weak (R0), no HCl reaction, medium plasticity Limestone 419.9-421.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl reaction, weak to medium strong (R2 to R3), <1/16" voids on 10-20% of surface No Recovery 421.1-424.0' Limestone 424.0-424.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on surface 10-20% Clayey Gravel (limestone Fragments) (GC) 424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction, extremely weak (R0), fine to medium grained limestone gravels, <1/2" Limestone 425.55-426.2' - yellowish gray, (5Y 8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	R46: 12 minutes	
>10		56	429.5' and 429.8': Man-made breaks Only able to obtain 4.0' run due to core blockage				
>10		3				R47: 12 minutes	
>10		>10					SC-6 collected at 435.3-436.2'
NR		NR				R48: 20 minutes	
444.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 13 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		R QD (%)	FRACTURES PER FOOT				DESCRIPTION		
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		
445 -403.0	R50-HQ 5 ft 94%	53	>10	439.0-439.6' - Fracture zone, no visible orientation, weak fragments <1/2", angular to subangular	Clayey Gravel (limestone Fragments) (GC) 426.2-426.4' - Same as 424.7-425.55' except slightly delayed strong HCl reaction, clay, low to medium plasticity Limestone 426.4-428.4' - Same as 425.55-426.2' except very fine to fine grained, slightly delayed moderate to strong HCl reaction, medium strong to strong (R3 to R4), laminations No Recovery 428.4-429.0' Limestone 429.0-430.2' - alternating yellowish gray and very light gray, (5Y 8/1 and N8), fine grained, delayed mild HCl reaction, very weak to weak (R1 to R2), laminar planar bedding with some variation 430.2-430.7' - yellowish gray, (5Y 8/1), very fine to fine grained, delayed mild HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16" Clay (CL) 430.7-431.0' - dark greenish gray, (5G 4/1), very fine grained, low to medium plasticity, no HCl reaction, extremely weak (R0) Limestone 431.0-431.5' - yellowish gray, (5Y 7/2), fine to medium grained, extremely weak (R0) 431.5-431.9' - Same as 429.0-430.2' except yellowish gray, (5Y 7/2), weak to medium strong (R2 to R3), laminations Clayey Gravel (limestone Fragments) (GC) 431.9-433.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), very fine to fine grained gravel, low to medium plasticity clay Limestone 433.0-436.2' - light olive gray, (5Y 5/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction when pulverized, undulating lamination 436.2-437.5' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 20% of surface	Manual break above 446.5' to fit in box R50: 14 minutes			
			2	439.6' - Bedding plane, horizontal					
			2	439.8' - Fracture, <5 deg, clay and gravels <1/2" fill					
			2	440.0-441.3' - Fracture zone, no visible orientation, fragments up to 2", mostly <1", subangular, possibly fine grained fill					
			2	444.0-444.8' - Fracture zone, fragments up to 1-3/16", subround, including quartz fragments					
			1	444.8' - Fracture, horizontal					
			NR	445.6, 445.9' - Fractures or mechanical break (2), horizontal, rough, undulating					
			3	446.6, 446.8' - Fractures or mechanical break, 10-20 deg, rough, undulating, fractures same direction					
			>10	447.5, 447.7' - Fractures, 10-20 deg, fractures angled in opposite directions: 447.5' angled toward ground surface, 447.7' angled away from horizontal					
			13	448.3' - Fracture, horizontal, smooth, undulating					
450 -408.0	R51-HQ 5 ft 44%	NR	NR	449.3' - Fracture, horizontal, smooth, undulating, bedding plane parting	R51: 14 minutes				
			NR	449.7' - Fracture, 30-40 deg, rough, undulating					
			>10	449.7-450.0' - Fracture or mechanical break, >80 deg, rough, undulating					
			>10	450.0-450.9' - Fracture zone, fragments up to 2-3/8", angular to subangular, trace black staining					
			2	454.0-454.3' - Fracture zone, no visible orientation, fragments up to 1-3/4", subangular					
			>10	454.3-454.9' - Fracture, rough, gradually undulating					
			>10	454.6, 454.8' - Fractures or mechanical break (2), horizontal to <10 deg					
			>10	454.9' - Fracture, 45 deg, rough, undulating					
			>10	455.2, 455.3' - Fractures or mechanical break (2), horizontal to <10 deg, rough, undulating, large angular gravels, 1-3/4"					
			NR	455.7-456.9' - Fracture zone, no visible orientation, fragments up to 4", mostly <1-3/16", including quartz - no HCl reaction					
455 -413.0	R52-HQ 5 ft 86%	0	>10	457.0' - Fracture, 20-30 deg, rough, undulating	R52: 17 minutes				
			1	457.3-457.5' - Fracture zone, fragments <1-3/16", including quartz					
			NR	457.9-458.3' - Fracture zone, angular fragments up to 2-3/8", horizontal bedding plane at 457.9'					
			2	459.1-460.4' - Fracture zone, no visible orientation, fragments up to 2-3/8", subangular, including quartz					
			>10	460.7' - Fracture, <10 deg, rough, undulating, fragments of quartz infill					
			2	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			460 -418.0	R53-HQ 2 ft 95%		0	>10	461.1' - Fracture or mechanical break, horizontal, rough, undulating	R53: 8 minutes
							1	461.1' - Fracture or mechanical break, horizontal, rough, undulating	
							NR	461.1' - Fracture or mechanical break, horizontal, rough, undulating	
							2	461.1' - Fracture or mechanical break, horizontal, rough, undulating	
>10	461.1' - Fracture or mechanical break, horizontal, rough, undulating								
2	461.1' - Fracture or mechanical break, horizontal, rough, undulating								
464.0	R54-HQ 3 ft 100%	39			>10		461.1' - Fracture or mechanical break, horizontal, rough, undulating	R54: 10 minutes	
					2		461.1' - Fracture or mechanical break, horizontal, rough, undulating		
					>10		461.1' - Fracture or mechanical break, horizontal, rough, undulating		
					2		461.1' - Fracture or mechanical break, horizontal, rough, undulating		
			>10	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			2	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			>10	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			2	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			>10	461.1' - Fracture or mechanical break, horizontal, rough, undulating					
			2	461.1' - Fracture or mechanical break, horizontal, rough, undulating					



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-01	SHEET 14 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
465 -423.0	R55-HQ 5 ft 82%	17	>10 1 >10 >10	461.9' - Mechanical break, horizontal, rough, undulating 462.2' - Fracture, horizontal, smooth, bedding plane parting 462.7-463.15' - Fracture zone: at 462.7', 20-30 deg; at 463.15', 20-30 deg (opposite directions), elsewhere no visible orientation, fragments up to 1-3/4", angular to subangular 463.4' - Fracture, horizontal, rough, undulating, bedding plane parting 463.7' - Fracture, horizontal, rough, undulating 464.3-465.0' - Fracture zone, no visible orientation, angular fragments up to 1-13/16" 465.3' - Fracture, horizontal, rough, undulating		437.5-438.0' - dark greenish gray with dusky yellow, yellowish gray, very light gray, (N8 with 5Y 6/4, 5GY 8/1, 5Y 4/1), very fine to fine grained, very strong delayed HCl reaction, strong (R4), trace chert layers 438.0-439.0' - yellowish gray, (5Y 7/2), moderate to strong delayed HCl reaction, strong (R4), <1/16" voids over <5% of surface, trace organics (peat or coal) Coal 439.0-439.5' - black, (N1), very fine to fine grained, extremely weak (R0), trace amounts of limestone fragments: dusky yellow (5Y 6/4), fine to medium grained, mild HCl reaction, trace calcite crystals to 1/8"	R55: 15 minutes Milky white quartz found on table after core was boxed; possibly from fracture zone, not found somewhere in run (after boxed)	
470 -428.0	R56-HQ 5 ft 90%	42	>10 4 0 >10 NR	465.7-466.8' - Fracture zone, (465.7-466.1': fine to medium infill with limestone fragments); fragments up to 1-3/4", black staining, mostly infill at 466.6-466.8' 467.4-467.9' - Fracture zone, rough, undulating, horizontal at 467.4', no visible orientation elsewhere, fragments up to 2-1/16", angular to subangular, similar infill to 465.7-466.8', fine to medium grained, <10% black staining 469.0-470.0' - Fracture zone, rough, undulating, fragments to 2-3/8", horizontal plane at 470.0'; possible bedding plane parting 470.6, 470.7, 470.75, 470.85' - Fractures (4), horizontal, rough, undulating 472.0, 472.3' - Fractures or mechanical break (2), 20 deg, rough, undulating, opposite directions 472.6' - Fracture, horizontal, rough, undulating 472.6-473.3' - Fracture zone, no visible orientation, fragments up to 4", mostly <2-3/8"		439.5-441.3' - moderate olive brown, (5Y 4/4), fine to medium grained, extremely weak (R0), fine grains have strong HCl reaction, gravels have moderate HCl reaction, 20-30% voids on gravel, some weak (R1) gravel No Recovery 441.3-444.0' Limestone 444.0-447.4' - yellowish gray, (5Y 7/2), fine to medium grained, very weak to weak (R1 to R2), strong HCl reaction where pulverized, voids to <1/16" over <5% of surface Limestone 447.4-448.7' - grayish orange, (10YR 7/4), fine grained, medium strong (R3), strong HCl reaction where pulverized No Recovery 448.7-449.0' Limestone 449.0-450.0' - yellowish gray with light gray laminations, (5Y 8/1 and N7), fine to medium grained, mild to moderate HCl reaction, alternating very weak (R1) and weak (R2) Limestone Fragments 450.0-451.2' - transition from yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), fine to medium grained, moderate to strong HCl reaction, medium strong (R3) in yellowish gray fragments, strong (R4) in moderate yellowish brown gravels No Recovery 451.2-454.0'	SC-7 collected at 470.85 to 472.05' R56: 10 minutes	
475 -433.0	R57-HQ 5 ft 100%	65	1 3 3 1 3	474.3-474.5' - Fracture, horizontal to <10 deg, open with fragment 2-3/8" 475.0' - Fracture or mechanical break, horizontal to <10 deg, rough, undulating 475.3' - Fracture, 20-30 deg, rough, with fragment 1-3/16", subangular 475.9' - Fracture or mechanical break, horizontal, rough, undulating, bedding plane parting 476.3, 476.4' - Fractures (2), horizontal to <10 deg, rough, undulating 476.5' - Fracture, 40-50 deg, rough, undulating, with large fragments 477.4' - Fracture or mechanical break, 10-20 deg, rough, undulating 478.2, 478.5' - Fractures or mechanical break (2), <10 deg, rough, undulating, black staining 478.8' - Mechanical break, horizontal, rough, undulating			R57: 13 minutes	
480 -438.0	R58-HQ 5 ft 96%	22	>10 >10 >10 1 2				R58: 10 minutes	
484.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
485 -443.0	R59-HQ 4 ft 88%	0	NR >10 2 >10 3 NR	478.9' - Fracture or mechanical break, 40-50 deg, rough, undulating 479.4-479.7' - Fracture zone, horizontal at 479.7', no visible orientation elsewhere, fragments up to 1-3/4" 479.7-480.0' - Fracture or mechanical break, 80-90 deg, rough, undulating 480.0' - Fracture, 30-40 deg, rough, undulating 480.0-480.4' - Fracture zone, fragments up to 1-3/4", angular 480.4' - Fracture, horizontal, rough, undulating, bedding plane parting 480.9-481.3' - Fracture zone, no visible orientation, fragments up to 1-3/4", angular to subangular 481.7' - Fracture, 30 deg, slightly rough, slightly undulating 481.9-482.2' - Fracture zone, no visible orientation, fragments up to 1-3/16" 482.9' - Fracture, horizontal to <10 deg, rough, undulating 483.3' - Fracture, <5 deg, rough, undulating 483.6-483.7' - Fracture, horizontal, rough, large fragment in between 1-3/16" 484.0-484.1' - Fracture zone, no visible orientation, fragments up to 1-5/8", mostly <5/8", subangular 484.3, 484.5' - Fractures (2), horizontal, slightly rough, slightly undulating, bedding plane partings 484.7, 484.8' - Fractures or mechanical break (2), horizontal, rough, undulating 484.9-485.2' - Fracture zone, fragments up to 2-3/8", rough, angular; horizontal fractures at 484.9' and 485.2': rough, undulating 485.4, 485.5' - Fractures or mechanical break (2), <10 deg, rough, undulating, possible bedding partings 485.8-486.3' - Fracture zone, fragments up to 3", mostly <5/8", subangular to angular 486.6' - Fracture or mechanical break, horizontal, rough, undulating 486.8, 487.0, 487.2' - Fractures or mechanical break (3), horizontal, rough, undulating 487.2-487.5' - Mechanical break, >80 deg, rough, undulating 488.0-488.3' - Fracture, 70 deg, rough, undulating 488.3' - Fracture or mechanical break, horizontal, rough, undulating 488.9' - Fracture or mechanical break, horizontal, rough, undulating, bedding plane parting 489.3' - Fracture, horizontal, rough, undulating, open with large rock fragment 1-3/4", angular 489.8-490.3' - Fracture zone, horizontal fragments, two large <4", mostly <1-3/16", trace silty infill		Limestone 454.0-456.8' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), <1/16" voids on 0-10% of surface 456.8-457.3' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCl reaction, very weak (R1), trace organics Limestone Fragments 457.3-458.3' - Same as 454.0-456.8' except more fragmented No Recovery 458.3-459.0' Limestone 459.0-460.0' - white to very light gray, (N9 to N8), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids to <1/16" over 10-20% surface area, laminations 460.0-460.4' - Same as 456.8-457.3' except yellowish gray, (5Y 7/2), fine to medium grained 460.4-460.9' - Same as 459.4-460.0' except moderate HCl reaction No Recovery 460.9-461.0' Limestone 461.0-462.2' - Same as 459.0-460.0' except fine grained, strong HCl reaction 462.2-463.0' - Same as 460.0-460.4' except yellowish gray with olive gray laminations, (5Y 7/2 with 5Y 3/2) 463.0-464.0' - Same as 461.0-462.2' except very light gray with light bluish gray, (N8 with 5B 7/1), fine to medium grained, strong to very strong HCl reaction, <10% voids on surface Limestone 464.0-465.7' - pale greenish yellow, (10Y 8/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), long voids to 1-1/2", mostly <1/16", over 20-30% of surface, possible dissolution features Silty Limestone Fragments (GM) 465.7-466.8' - dusky yellow, (5Y 6/4), medium grained, moderate to strong HCl reaction, extremely weak (R0) Limestone 466.8-467.4' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak (R2), <10% voids to <1/16" on surface, undulating laminations transition to planar, trace organics	R59: 13 minutes SC-8 collected at 490.35-491.25' R60: 20 minutes R61: 18 minutes	
488.0								
490 -448.0	R60-HQ 6 ft 70%	38	>10 >10 >10 NR					
494.0								
495 -453.0	R61-HQ 6 ft 62%	22	3 >10 1 >10 NR					
500 -458.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone With Peat 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 increasing with depth, weak (R2), at 478.2' <1-3/16" zone of extremely weak to very weak (R0 to R1) with strong HCl reaction, voids <1/16" 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 No Recovery 483.8-484.0'</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.17 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone 484.0-487.5' - yellowish gray, (5Y 7/2), fine to medium grained, weak (R2), moderate to strong HCl 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 HCl 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'</p> <p>Limestone 488.0-492.2' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl 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 HCl, very similar to 474.0-479.0' and 484.0-487.5' No Recovery 492.2-494.0'</p> <p>Limestone 494.0-497.7' - yellowish gray, (5Y 7/2), fine to medium grained decreasing with depth (fining down), moderate to strong HCl 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'</p> <p>Bottom of Boring at 500.0 ft bgs on 9/7/2007</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 2 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-177.7	R5-HQ 5 ft 82%	22	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	[Symbolic Log]	Silty Limestone Fragments 219.0-219.3' - yellowish gray, (5Y 7/2), mild HCl reaction, with broken limestone fragments up to 1/8" in diameter Limestone 219.3-220.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), laminar bedding planes 220.0-223.1' - pale greenish yellow, (10Y 8/2), moderate to strong HCl reaction, weak (R2), fossil molds and casts, surface cavities (trace amounts) up to 1/4" wide and 1/4" in height, pitting on surface No Recovery 223.1-224.0' Limestone 224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R5: 9 minutes	
			>10	219.9, 223.0' - Fractures, 60-90 deg, rough, undulating				
			4	221.5-221.8' - Fracture zone, fragments up to 1/2" in diameter				
224.0			NR					
225	R6-HQ 5 ft 98%	43	>10	224.1, 225.1, 225.5, 226.1, 226.7, 227.1, 227.6, 228.3' - Mechanical break (8), rough to smooth, undulating	[Symbolic Log]	224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R6: 9 minutes	
-182.7			3	224.4-224.8' - Fracture zone, multiple breaks, angular fragments up to 1" in diameter				
			1	227.7-228.0' - Fracture zone, smooth to rough, along bedding planes, horizontal along bedding planes to 40 deg				
			>10	228.6' - Bedding plane, horizontal, smooth				
229.0	R7-HQ 5 ft 80%	60	NR		[Symbolic Log]	224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R7: 12 minutes	
			6	230.0-230.3' - Fracture zone, rough, angular rock fragments				
230			1	230.5, 231.8, 232.6, 232.8' - Mechanical break, 0-30 deg, rough, undulating				
-187.7			1	231.5' - Mechanical break				
	R8-HQ 5 ft 96%	0	2	232.5' - Mechanical break	[Symbolic Log]	224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R8: 8 minutes	
			NR					
234.0			>10	234.0, 234.6, 235.5-235.8, 236.1-236.7, 237.1-237.5, 237.8-238.8' - Fracture zone (6)				
235			>10					
-192.7	R8-HQ 5 ft 96%	0	>10		[Symbolic Log]	224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R8: 8 minutes	
			>10					
			>10					
			>10					
239.0	R8-HQ 5 ft 96%	0	NR		[Symbolic Log]	224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in thickness throughout section - some black organic material, surface pitting is present throughout the section No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil casts No Recovery 233.0-234.0' Limestone 234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), surface pitting throughout entire section Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	R8: 8 minutes	
			1					
240								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 9/08/07 START : 9/8/2007 END : 9/12/2007 LOGGER : J. Burkard, R. Bitely, T. Borton, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-197.7	R9-HQ 5 ft 88%	53	2	239.5, 240.1, 241.6, 241.8, 242.3, 242.7, 243.0, 243.3' - Mechanical break, 0-10 deg, rough, undulating	[Symbolic Log]	Limestone 237.1-238.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), with 1/4" sections of very fine grain limestone No Recovery 238.8-239.0' Limestone 239.0-243.4' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak (R1), surface pitting throughout section, trace voids (1/16") throughout section No Recovery 243.6-244.0' Limestone 244.0-249.0' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak (R1), surface pitting throughout section, very brittle rock	R9: 7 minutes	
>10			241.1-241.3' - Fracture zone					
3								
1								
244.0			NR	244.0-244.7' - Fracture zone				
245	R10-HQ 5 ft 100%	22	>10	245.0, 245.5, 245.9, 246.1, 246.5, 246.8, 246.9, 247.3, 247.5, 247.8, 247.9' - Mechanical break (11), 0-10 deg, rough, undulating	[Symbolic Log]		R10: 6 minutes	
-202.7			3					
			4					
			4					
			>10	248.1-248.5, 248.7-250.0' - Fracture zone (2), rough, undulating				
249.0			3	249.4, 249.6, 250.1, 250.5, 251.6, 252.7' - Mechanical break (6), 0-30 deg, rough, undulating	[Symbolic Log]		R11: 9 minutes	
250	R11-HQ 5 ft 100%	23	4	250.8-251.1' - Bedding plane, horizontal, smooth, undulating				
-207.7			4					
			6	252.3-252.4, 253.1-253.2' - Fracture zone (2), rough, undulating				
			3	253.0' - Bedding plane, horizontal, smooth				
254.0			2	254.2, 254.3, 255.1, 255.2, 255.8, 256.3, 256.9, 257.2, 257.4, 257.7, 258.3, 258.8' - Mechanical break (12), smooth to rough, undulating to stepped	[Symbolic Log]		R12: 9 minutes	
255	R12-HQ 5 ft 100%	73	3					
-212.7			2					
			3					
			7	258.4-258.5' - Fracture zone, angular rock fragments				
259.0			2					
260								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 4 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-217.7	R13-HQ 5 ft 96%	50	2	259.1, 259.5, 260.1, 260.7, 261.3, 261.4, 261.8, 263.2, 263.6' - Mechanical break (9), 0-10 deg, rough, undulating	[Symbolic Log]	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
			2				
			>10	262.1-262.2' - Fracture zone, angular rock fragments up to 1/2"			
			8	262.5-263.1' - Fracture zone, rough, undulating, 10 angular rock fragments up to 2" in diameter			
264.0							
265 -222.7	R14-HQ 5 ft 94%	40	>10	264.3-265.0' - Fracture zone, rough, undulating, up to 1" in length angular rock fragments	[Symbolic Log]	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 surface	R14: 8 minutes
			5	265.5, 265.7, 266.0, 266.1, 266.3, 266.6, 267.4, 267.7, 268.4' - Mechanical break (9), 0-20 deg, rough, undulating			
			4				
			5	267.0-267.2' - Fracture zone, rough, undulating, up to 1" in length angular rock fragments			
			1				
269.0							
270 -227.7	R15-HQ 5 ft 82%	33	>10	269.0-271.0' - Fracture zone	[Symbolic Log]	266.9-267.5' - pale greenish yellow, (10Y 8/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), wavy bedding planes 1/16" in thickness 267.6-268.7' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl 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, moderate HCl reaction, very weak to weak (R1 to R2), with angular gravel-sized rock fragments	SC-3 collected at 270.95-272.35'
			>10	269.8-269.9' - Fracture zone			
			1	271.3, 272.3, 272.7, 273.0' - Mechanical break (4), 0-30 deg, rough, undulating to stepped			
			4				
274.0							
275 -232.7	R16-HQ 5 ft 46%	13	>10	274.3' - Fracture, horizontal, rough, undulating, tight	[Symbolic Log]	271.9-272.3' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), trace voids 272.3-273.1' - yellowish gray, (5Y 8/1), moderate to strong HCl reaction, very weak to weak (R1 to R2), bedding planes transition from wavy to laminar 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' No Recovery 276.3-279.0'	R15: 7 minutes End drilling for the day at 16:43, 09/08/07 Continue drilling 09/09/07, Water level 3' below ground surface
			>10	274.45' - Fracture, 85 deg, rough, undulating, tight			
			>10	274.55-274.8' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" in diameter			
			NR	275.0' - Bedding plane, horizontal, smooth, tight			
279.0							
			NR	275.4' - Fracture, horizontal, rough, undulating, open (3/8"), organic layering			R16: 11 minutes
			NR	275.7-276.3' - Fracture zone, fragments up to 1-3/16" in diameter			
280			NA	279.25' - Mechanical break, horizontal, rough, undulating			R. Bitely begins logging



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 5 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	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.
-237.7	R17-HQ 5 ft 82%	0	5	279.45' - Fracture, 60 deg, rough, undulating, tight		Sandy Silt (ML) 279.0-280.0' - yellowish gray to light olive gray, (5Y 7/2, 5Y 5/2), fine to medium grained, mild to moderate HCl reaction, trace laminated bedding Limestone 280.0-283.1' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), voids up to 9/16" diameter over 3-4% of rock surface, poorly fossiliferous, bedding plane laminations from 282.0-283.1' No Recovery 283.1-284.0' Limestone 284.0-289.0' - yellowish gray, (5Y 7/2), very fine to coarse grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), voids up to 3/8" diameter over 5% of rock surface, solution cavities up to 1-3/16" in diameter over 5% of rock surface, poorly fossiliferous, trace bedding plane laminations, trace organics No Recovery 291.6-294.0' Limestone 294.0-297.9' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), 60% carbonate sandy silt No Recovery 297.9-299.0'	R17: 9 minutes	
		>10	279.65-280.0' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" in diameter					
		7	280.3' - Fractures (2), 60 deg, rough, undulating, tight					
		NR	280.5' - Fracture, 30 deg, rough, undulating					
			280.7-280.8' - Fracture zone, slight brown staining, fragments up to 3/4" in diameter					
			280.95' - Fracture, 60 deg, rough, undulating, tight					
284.0			281.3' - Fracture, horizontal, rough, undulating, slight brown-black staining, open 1-3/16" calcite crystallization					
285			281.55-281.8' - Fracture zone, fragments up to 3/4" in diameter					
-242.7	R18-HQ 5 ft 100%	46	281.9, 282.05, 282.25, 282.45, 282.8, 282.85' - Bedding plane (6), horizontal, smooth					
		3	282.65' - Fracture, rough, undulating, open					
		1	284.25-284.4' - Fracture zone, multiple intersecting fractures with rock fragments up to 3/4" in diameter					
		1	284.75' - Fracture, 60 deg, rough, undulating, open to 3/8"					
			285.2' - Fracture, horizontal, rough, undulating, open from 1/2" to 1"					
289.0			285.3' - Mechanical break					
			285.4' - Mechanical break or fracture, horizontal, rough, undulating					
290			285.7-285.9' - Fracture zone, rock fragments up to 1-3/16"					
-247.7	R19-HQ 5 ft 52%	22	286.4, 286.45, 286.7' - Bedding plane (3), horizontal, smooth					
			287.4' - Mechanical break, horizontal, rough, undulating, open to 3/8"					
		NR	288.1' - Fracture, horizontal, rough, undulating, tight					
			289.0-289.3' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" in diameter					
			289.8' - horizontal, rough, undulating, open to 3/8"					
294.0			290.6-291.6' - Fracture zone, rock fragments up to 1-9/16" in diameter					
			294.0-294.9' - Fracture zone, rock fragments up to 1-3/16" in diameter					
295			295.6-297.0' - Fracture zone, rock fragments up to 1-3/16" in diameter					
-252.7	R20-HQ 5 ft 78%	14	297.3' - Fracture, horizontal, rough, undulating, tight					
		NR						
299.0								
300		3	299.3' - Fracture, 45 deg, smooth, trace black organic staining, tight					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 9/08/07 START : 9/8/2007 END : 9/12/2007 LOGGER : J. Burkard, R. Bitely, T. Borton, J. Townes

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-257.7	R21-HQ 5 ft 74%	11	3	299.5, 299.6, 300.2, 300.3' - Fractures (4), horizontal, rough, undulating, trace black organic staining, tight		Limestone 299.0-300.3' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate HCl reaction, extremely weak (R0), black organic mottling over 20% of rock surface 300.3-300.7' - olive gray to yellowish gray, (5Y 3/2, 5Y 7/2), very fine grained, extremely weak (R0), organic content decreasing with depth from 1-3/16" lens of organic silt at 300.3' below ground surface, faint to mild organic odor, fossiliferous, transition to a carbonate silt with depth Sandy Silt (ML) 300.7-302.7' - yellowish gray, (5Y 7/2), low to medium plasticity, >50% silt, <50% limestone fragments as sand sized fraction No Recovery 302.7-304.0' Silt (ML) 304.0-304.6' - yellowish gray, (5Y 7/2), low to medium plasticity, mild to moderate HCl reaction, limestone fragments as sand sized fraction >50% Limestone 304.6-305.1' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), light gray mottling over 40% of surface, moderately fossiliferous casts and molds (1/8-1/4"), laminated organics Silt (ML) 305.1-305.4' - Same as 304.0-304.6' Limestone 305.4-308.5' - Same as 304.6-305.1' No Recovery 308.5-309.0' Limestone 309.0-314.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to medium strong (R0 to R3), highly variable trace voids 1/16", poorly fossiliferous, trace organic lamination, laminated silty intervals from 311.35-311.5 and 311.65-311.8'	R21: 12 minutes	
304.0		NA	301.0' - Fracture zone, rock fragments up to 3/4" in diameter					
		NA	301.2' - Mechanical break, 20 deg					
		NR	301.8-301.9, 302.2-302.7' - Fracture zone (2), rock fragments up to 3/4" in diameter					
305		>10	304.65, 305.4, 305.7, 306.35, 306.75' - Bedding plane or mechanical break (5), <10 deg, smooth to rough, planar to undulating					
-262.7	R22-HQ 5 ft 90%	40	305.95-306.35' - Fracture zone, rough, undulating to planar, rock fragments <2" in diameter					
		0	306.9-307.0' - Fracture zone, rough, undulating, rock fragments <1" in diameter					
		4	308.3-308.5' - Fracture zone, rough, undulating, rock fragments <1-1/2" in diameter					
309.0		NR						
310		>10	309.5-309.75' - Fracture zone, rough, undulating, silt lenses, rock fragments <2" in diameter					
-267.7	R23-HQ 5 ft 100%	58	310.25, 310.9' - Fractures or mechanical break (2), rough, undulating					
		>10	310.5' - Fracture or mechanical break, 30 deg, rough, undulating					
		6	312.0, 312.05, 312.1, 312.2' - Fractures (4), 0-90 deg, rough, undulating					
		3	312.45, 313.05, 313.45, 313.95' - Fractures or mechanical break (4), <10 deg, rough, undulating					
314.0		2	314.9, 315.2' - Fractures or mechanical break (2), 10 deg and 40 deg, rough, undulating					
315		2	315.7-316.75' - Fracture zone, rough, undulating, silt lenses, rock fragments <3" in diameter					
-272.7	R24-HQ 5 ft 98%	30	317.1, 317.5' - Fractures or mechanical break (2), 70 deg and 50 deg, rough, undulating					
		>10	317.5-317.9' - Fracture zone, rough, undulating, rock fragments <3" in diameter					
		>10	318.2' - Fractures or mechanical break, <10 deg, rough, undulating					
319.0		NR						
		>10						
320								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 7 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-277.7	R25-HQ 5 ft 100%	27	>10	318.65-318.9' - Fracture zone or mechanical break, rough, undulating, rock fragments <2" in diameter		314.0-318.9' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, extremely weak to medium strong (R0 to R3), highly variable trace voids <1/16", poorly fossiliferous, trace organic laminations, interlaminated silt lenses and limestone rock fragments at 314.4-314.55' and 315.7-316.75'	R25: 9 minutes	
			>10	319.3-319.8, 320.1-320.4, 320.6-320.8, 321.7-322.1, 322.35-322.65, 323.2-323.3' - Fracture zone (6), undulating, rock fragments <1" in diameter, friable		318.9-319.0' - No Recovery 318.9-319.0' Limestone		
			>10	319.9, 321.1, 321.2, 321.3, 322.8, 323.8' - Fractures or mechanical break (6), 20 deg, rough, undulating		319.0-324.0' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), with friable carbonate silts with <50% sand-sized limestone fragments, poorly fossiliferous		
324.0			10			324.0-326.7' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak to very weak (R0 to R1), trace laminated organics		
325			2	324.45, 324.95, 325.4, 325.8, 326.3' - Fractures or mechanical break (5), <10-30 deg, rough, undulating		325.1-325.7' - Same as 324.0-326.7' except mild to moderate HCl reaction, moderately fossiliferous, fossil shells to 1/2"		
-282.7	R26-HQ 5 ft 100%	42	2	326.7-329.0' - Fractures or mechanical break, smooth to rough, undulating		Sandy Silt With Limestone (ML)		R26: 13 minutes
			NA			326.7-329.0' - very fine to fine grained, low to medium plasticity, mild to moderate HCl reaction, sandy silt (carbonate), carbonate silt with <50% limestone fragments as sand fraction; limestone interbeds, extremely weak to very weak (R0 to R1), strong to very strong odor (crude petroleum and hydrogen sulfide), poorly fossiliferous		
			NA			Limestone		R27: 8 minutes
329.0			>10	329.0-329.3' - Fracture zone, rough, undulating, rock fragments <1" in diameter		329.0-333.6' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over 10% of surface, one cavity or fossiliferous cast 1" in diameter, few cavities <1/4" in diameter, trace organic lenses, moderately fossiliferous, trace laminated organics		
330	R27-HQ 5 ft 92%	67	2	329.4, 329.45' - Fractures or mechanical break (2), 40 deg and 20 deg, rough, undulating		No Recovery 333.6-334.0'		
-287.7			1	329.7, 330.4, 330.85, 331.9' - Bedding plane or mechanical break (4), <10 deg, rough, undulating				
			>10	332.15-332.35' - Fracture zone, rough, undulating, rock fragments <2" diameter		R28: 12 minutes		
			0					
			NR			J. Townes begins logging		
334.0			>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, 338.25-338.4' - Fracture zone (7), rough, undulating, sandy silt lenses with rock fragments <2" in diameter				
335	R28-HQ 5 ft 88%	8	>10	335.45, 335.7, 335.95' - Bedding plane or mechanical break (3), <10 deg, rough, undulating				
-292.7			>10					
			>10					
			NR					
339.0			2					
340								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-297.7	R29-HQ 5 ft 94%	62	>10	339.4' - Mechanical break, horizontal, silt lens with angular rock fragments up to 3/4" in diameter		Limestone 334.0-338.4' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, extremely weak (R0), silt lenses interbedded with extremely weak rock, 80% of core is sandy silt carbonate material of low to medium plasticity, >50% limestone fragments as sand fraction, trace decomposing organic odor No Recovery 338.4-339.0' Limestone 339.0-339.85' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), limestone fragments up to 3/4" in diameter, calcite crystals, moderate yellow Organic Material (OH) 339.85-340.0' - dark brown to black, mild HCl reaction, organic layer, bedding laminations Limestone 340.0-340.4' - Same as 339.0-339.85' 340.4-343.7' - light gray, (N7), very fine to medium grained, moderate to strong HCl reaction, very weak (R1), black organic mottling over 20% of rock surface No Recovery 343.7-344.0' Limestone 344.0-349.0' - light gray, (N7), very fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), black and blue mottling over 20% or rock surface, trace laminations 349.0-353.85' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), trace laminated bedding with organics, cavities up to 3/8" in diameter are fossil burrows and over 10% of rock surface from 351.0-352.0' bgs. No Recovery 353.85-354.0' Limestone 354.0-359.0' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 50% of rock surface and are fossil molds, cavities up to 2" in diameter over 1-2% of rock surface, fossiliferous	R29: 7 minutes	
344.0			2	339.6' - Mechanical break, horizontal, rough, undulating, along bedding plane				
			0	340.25-340.4' - Fracture zone or mechanical break, silt lens				
			1	341.35, 341.7' - Bedding plane (2), horizontal, fractures along contact of silt lens				
			NR	343.25' - Fracture, horizontal, rough, undulating, tight				
345			1					
-302.7	R30-HQ 5 ft 100%	71	2	344.8, 345.55, 345.9, 346.4, 346.6, 346.9, 347.45, 348.9' - Bedding plane (8), horizontal, rough, undulating, tight				
			3					
			1					
			1					
349.0			0					
350	R31-HQ 5 ft 97%	76	2	350.35, 350.9, 351.85, 352.4' - Bedding plane or mechanical break (4), horizontal, rough, undulating, tight				
-307.7			1					
			2					
			1	352.9, 353.6' - Mechanical break (2), 0-90 deg, rough, undulating				
			NR					
354.0			1	354.4, 357.0, 357.9' - Fractures (3), horizontal, rough, undulating, open up to 3/8"				
355	R32-HQ 5 ft 100%	94	0					
-312.7			1	356.3, 356.5' - Mechanical break (2)				
			1					
			0					
			2					
359.0								
360								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-317.7	R33-HQ 5 ft 98%	62	2	359.6' - Mechanical break, horizontal, rough, undulating, 3/4" relief	[Symbolic Log]	Limestone 359.0-363.9' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 10% of rock surface and are fossil molds, cavities up to 3/4" in diameter over 1-2% of rock surface, trace organics, moderately fossiliferous	R33: 8 minutes
1			359.8' - Mechanical break, vertical, rough, undulating				
2			360.2' - Bedding plane, horizontal, rough, undulating, bedding plane fracture along organic layer				
1			360.5, 361.3, 362.5, 362.9, 363.55' - Mechanical break, horizontal, rough, undulating 361.5' - Mechanical break				
364.0			NR			No Recovery 363.9-364.0' Limestone 364.0-366.55' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 10% of rock surface and are fossil molds, trace organic laminations, fossiliferous 366.55-368.55' - white to very light gray, (N9 to N8), very fine to fine grained, strong HCl reaction, medium strong (R3), voids up to 3/8" over 20% of rock surface and are fossil molds, cavities up to 1-3/16" over 5% of rock surface, fossiliferous 368.55-368.9' - Same as 364.0-366.55'	
365 -322.7	R34-HQ 5 ft 98%	82	1	364.6, 365.45' - Bedding plane, horizontal, rough, undulating	[Symbolic Log]	No Recovery 368.9-369.0' Limestone 369.0-373.55' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, medium strong (R3), voids up to 3/8" over 20% of rock surface and are fossil molds, trace organic layering, moderately fossiliferous	SC-7 collected at 367.3-368.3' R34: 9 minutes
>10			366.5-366.65' - Fracture zone, rock fragments up to 3/4" in diameter				
1			367.3, 368.3' - Mechanical break (2), horizontal, rough, undulating				
1							
369.0			NR				
370 -327.7	R35-HQ 5 ft 91%	66	2	369.45, 369.85' - Fractures (2), horizontal, rough, undulating, tight	[Symbolic Log]	No Recovery 373.55-374.0' Limestone 374.0-378.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, medium strong (R3), voids up to 3/8" over 10% of rock surface and are fossil molds, trace organic layering, fossiliferous, cavities up to 9/16" over 1-2% of rock surface and are dissolution fossil molds	R35: 8 minutes
1			370.5' - Bedding plane, horizontal, smooth, tight, fracture along organic layering				
>10			371.4-371.5' - Fracture zone, rock fragments up to 3/4" in diameter				
>10			372.1' - Fracture, horizontal, rough, undulating, tight 372.8-373.1' - Fracture zone, rock fragments up to 1-9/16" in diameter				
374.0			NR				
375 -332.7	R36-HQ 5 ft 90%	46	4	374.25, 374.4, 374.75, 374.95, 375.3, 375.5, 376.45, 377.7, 378.15' - Mechanical break or bedding plane (9), horizontal, rough, undulating, tight	[Symbolic Log]	No Recovery 378.5-379.0' Limestone 379.0-379.3' - Fracture zone, rock fragments up to 1-9/16" in diameter	R36: 8 minutes
2							
1			377.1, 377.35' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight				
3							
379.0			NR				
380			>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-337.7	R37-HQ 5 ft 82%	36	3	379.6, 379.8, 380.0' - Fractures (3), horizontal, smooth, tight		Limestone 379.0-383.1' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, medium strong (R3), voids up to 3/8" over 20% of rock surface and are fossil molds, fossiliferous	R37: 8 minutes	
1			380.2-380.4' - Fracture zone, rock fragments up to 1-9/16" in diameter					
>10			380.8, 381.4' - Fractures (2), horizontal, rough, undulating, open to 3/4"					
384.0			0	382.7-382.9' - Fracture zone, rock fragments up to 1-9/16" in diameter		No Recovery 383.1-384.0'		
385	R38-HQ 5 ft 88%	53	>10	384.0-384.5' - Fracture zone, rock fragments up to 1-9/16" in diameter		384.0-384.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" over 20% of rock surface and are fossil molds, moderately fossiliferous	R38: 8 minutes	
-342.7			>10	384.7, 384.95' - Fractures (2), horizontal, rough, undulating, 3/4" relief				
			2	385.6-385.75' - Fracture zone, rock fragments up to 3/4" in diameter				
			1	386.2, 386.55, 387.15' - Fractures (3), horizontal, rough, undulating, 3/8" relief				
			NR	386.4-386.8' - Mechanical break				
389.0			>10	389.0-389.9' - Fracture zone, rock fragments up to 1-9/16" in diameter		385.75-385.95' - Same as 384.5-385.75' except organic laminated limestone		
390	R39-HQ 5 ft 54%	9	>10	390.0' - Fracture, vertical, rough, undulating, tight		385.95-388.4' - Same as 384.0-384.5'		
-347.7			>10	390.1, 390.3' - Fractures (2), horizontal, rough, undulating, tight		No Recovery 388.4-389.0'		
			>10	390.5-390.6' - Fracture zone, rock fragments up to 3/4" in diameter		Limestone		
			NR	390.8, 391.95, 391.2' - Fractures (3), horizontal, rough, undulating, tight		389.0-391.7' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), voids up to 1/16" over 1-2% of rock surface, poorly fossiliferous, trace organic laminations	R39: 8 minutes	
			NR	391.5' - Mechanical break		No Recovery 391.7-394.0'		
394.0			1	394.0-399.0' - Fracture zone, rock fragments up to 1-9/16" in diameter		Limestone		
395	R40-HQ 5 ft 100%	46	3	395.0, 395.4, 395.75, 396.0, 396.4' - Fractures (5), horizontal, rough, undulating, tight to open		394.0-399.0' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids up to 3/16" over 10% of rock surface and are fossil molds, moderately fossiliferous, trace laminations		
-352.7			>10	396.7-397.1' - Fracture zone, rock fragments up to 1-3/16" in diameter				
			4	397.45, 397.65, 397.9' - Fractures (3), horizontal, rough, undulating, tight				
			>10	398.3-399.0' - Fracture zone, rock fragments up to 1-9/16" in diameter			R40: 6 minutes	
399.0			4					
400								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-357.7	R41-HQ 5 ft 69%	31	4	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	
404.0			2					
			1					
			NR					
405			3	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		Limestone 404.0-408.3' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl 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		
-362.7	R42-HQ 5 ft 86%	25	>10	406.0' - Fracture zone, fragments up to 1-9/16" in diameter		No Recovery 408.3-409.0'	R42: 8 minutes	
			>10	407.4-408.3' - Fracture zone, fragments up to 1-9/16" in diameter, quartz grains up to 3/8" found as infill material				
			2					
			NR					
409.0			>10	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"		Limestone 409.0-414.0' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl 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', carbonate clay/silt with limestone fragments at 412.8-413.0'	Complete drilling at 15:15 on 09/10/07 due to proximal lighting, water level at surface R. Bitely begins logging	
410	R43-HQ 5 ft 100%	58	1	409.7-410.05' - Fracture zone, rough, undulating, rock fragments with carbonate silt matrix, fragments <1" in diameter				
-367.7			1					
			1					
			3					
414.0			>10	414.5-415.0' - Fracture zone, rough, undulating, rock fragments <2" in diameter		414.0-416.6' - yellowish gray, (5Y 7/2), very fine to medium grained, 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	R43: 8 minutes	
415	R44-HQ 5 ft 94%	26	10	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"				
-372.7			NA	415.6-415.85' - Fracture zone, rough, undulating, rock fragments <2" in diameter		Organic Elastic Silt To Organic Fat Clay (MH-CH) 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	
			NA	416.55-416.7, 417.1-417.15, 417.4-417.45, 417.65-418.05' - Fracture zone (4), rough, undulating, organic silt and rock fragments <2" in diameter with carbonate silt lenses interbedded.				
			3					
			NR					
419.0			>10					
420								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-377.7	R45-HQ 5 ft 88%	13	>10	419.0-419.4, 419.6-419.7, 419.8-420.4, 421.75-422.4, 422.65-423.4' - Fracture zone (5), silt infilling, rock fragments <2" in diameter		Limestone 417.4-418.7' - yellowish gray, (5Y 7/2), very fine to medium grained, 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 No Recovery 418.7-419.0'	R45: 8 minutes	
			>10	419.5, 420.6, 420.9, 421.65' - Bedding plane or mechanical break (4), <10 deg, rough, undulating, tight, open <1/2"				
			>10					
424.0			NR					
425			>10	424.5' - Bedding plane or mechanical break, horizontal, rough, undulating		Limestone 419.0-423.4' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), interbedded carbonate silt lenses, voids <1/16" over 10% of surface, cavity up to 0.5' long from 421.75-422.25' with crystalline quartz growth, laminated bedding over 10% of surface No Recovery 423.4-424.0'	R46: 12 minutes	
-382.7	R46-HQ 5 ft 80%	16	>10	424.8-424.9, 425.1-425.6, 426.2-426.3, 427.1-428.0' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter				
			>10	425.9, 426.75' - Fractures or mechanical break (2), <10 deg, rough, undulating, tight, open <1/2"				
			>10					
429.0			NR					
430			>10	429.3, 429.6' - Mechanical break (2), 50 deg and 60 deg		Limestone 424.0-428.0' - yellowish gray, (5Y 7/2), very fine to medium grained, moderate HCl 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" 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'	R47: 15 minutes	
-387.7	R47-HQ 5 ft 92%	8	>10	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				
			>10	431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2'				
			>10					
			>10					
434.0			NR					
435			NA			Limestone 429.0-433.6' - yellowish gray to grayish black, (5Y 7/2 to N2), strong HCl 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', mottled coloration along bedding planes, especially in stronger limestone, poorly fossiliferous, trace voids <1/16" No Recovery 433.6-434.0'	R48: 13 minutes	
-392.7	R48-HQ 5 ft 100%	48	>10	436.35' - Bedding plane or mechanical break, horizontal, rough, stepped to undulating, tight				
			0	437.35' - Mechanical break				
			3	438.25' - Bedding plane or mechanical break, horizontal, rough, stepped to undulating, tight				
			>10	438.75, 438.9' - Fractures or mechanical break (2), 50 deg and 80 deg, rough, undulating				
439.0								
440								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 13 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-397.7	R49-HQ 5 ft 64%	11	>10	439.0-439.3, 439.5-440.15, 440.7-441.1, 441.9-442.2' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter		Clay (CL) 434.6-436.2' - dark greenish gray, (5GY 4/1), carbonate, varve-like laminated organics, few silica nodules to subhedral quartz up to 1/2" diameter at 435.2' Limestone 436.2-439.0' - dark greenish gray, (5GY 4/1), very fine to fine grained, strong HCl reaction, medium strong to strong (R3 to R4), laminated, varve-like organic laminations, trace limestone casts or secondary carbonate mineralization up to 1" diameter, poorly fossiliferous 439.0-439.7' - yellowish gray, (5Y 7/2), mild HCl reaction, weak to medium strong (R2 to R3), with interbedded carbonate silt lenses, voids <1/16" over 20% of surface, poorly fossiliferous, 1/4" organic peat lens at 439.35' Silt (ML) 439.7-440.2' - medium plasticity, <50% limestone fragments as sand sized fraction, organic peat lens at 440.2' Limestone 440.2-441.25' - medium light gray to yellowish gray, (N6 to 5Y 7/2), mild HCl reaction, strong (R4), voids <1/16" over 30% of rock surface, cavities <1" diameter over 10% of surface, mottled coloration due to secondary mineralization of cavities, organic associated with cavities, with calcite crystals at 440.2-441.25' and 441.27-442.2' 441.25-442.2' - moderate yellowish brown, (10YR 5/4), very weak to weak (R1 to R2), faintly laminated organics No Recovery 442.2-444.0' Limestone 444.0-447.3' - medium light gray, (N6), very fine grained, strong HCl reaction, strong (R4), voids up to 3/32" over 20% of rock surface, cavities up to 9/16" over 1-2% of rock surface and some are filled with quartz crystallization No Recovery 447.3-449.0'	R49: 14 minutes	
444.0			>10	444.0-445.5' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-9/16" in diameter				
445 -402.7			R50-HQ 5 ft 66%	7	>10			445.1, 445.9' - Fractures (2), 45 deg, rough, undulating, tight		R50: 16 minutes
449.0	0	446.4' - Fracture, 45 deg, rough, undulating, tight						
450 -407.7	R51-HQ 5 ft 66%	24	>10	446.5' - Mechanical break 446.9, 447.0' - Fractures (2), horizontal, rough, undulating, tight		J. Townes begins logging		
454.0	>10	449.45' - Fracture, 45 deg, rough, undulating, tight						
455 -412.7	R52-HQ 5 ft 82%	28	>10	449.7, 449.95' - Fractures (2), horizontal, rough, undulating, tight			R51: 9 minutes	
459.0	>10	450.5' - Fracture, horizontal, rough, undulating, tight						
460	>10	450.9-451.2' - Fracture zone, rock fragments up to 1-9/16" in diameter						
			>10	451.6-452.3' - Fracture zone, rock fragments up to 1-9/16" in diameter		R52: 15 minutes		
			>10	454.0-455.5' - Fracture zone, multiple, high angle, intersecting fractures, rock fragments up to 2-3/8" in diameter				
			>10	455.6, 456.0, 456.4, 456.9, 457.0, 457.1' - Fractures (6), horizontal, rough, undulating, tight				
			>10	456.6-456.7' - Fracture zone, rock fragments up to 3/4" in diameter				
			NR	457.45-457.65' - Fracture zone, rock fragments up to 1-3/16" in diameter				
			>10	459.0-459.3' - Fracture zone, rough, undulating, rock fragments <2" in diameter				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-02	SHEET 14 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-417.7	R53-HQ 5 ft 80%	46	>10	459.9-460.05' - Fracture zone, rough, undulating, rock fragments <1" in diameter 460.3-460.75' - Fracture zone, rough, undulating, rock fragments <3" in diameter, 2 vertical fractures from 460.4-460.7' 460.85, 461.25, 461.95, 462.3' - Bedding plane or mechanical break (4), rough, undulating, tight, open to <1/2" 461.5' - Mechanical break	[Symbolic Log]	Limestone 449.0-452.3' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCl reaction, strong (R4), carbonate sandy silt lens from 451.6-451.8' is extremely weak rock, voids up to 3/16" over 5% of rock surface and are filled with crystallization, trace organic laminations at 451.5' No Recovery 452.3-454.0' Limestone 454.0-458.1' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCl reaction, strong (R4), voids up to 3/16" over 5% of surface, trace organic laminations at 456.9' No Recovery 458.1-459.0' Limestone 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), voids <1/16" over <10% of rock, cavities <3/4" from 462.0-463.0', trace laminated organics, cavity infilling, crystalline growth of calcite/aragonite, very weak to weak transition from 461.25-461.55' No Recovery 463.0-464.0' Limestone 464.0-464.9' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCl reaction, medium strong to strong (R3 to R4), trace organic increasing with depth, voids up to 3/32" over 1-2% of rock surface Silt With Limestone Fragments (ML) 464.9-465.9' - fine grained, strong HCl reaction, extremely weak (R0), with limestone fragments, high organic content, strong organic odor Limestone 465.9-466.5' - Same as 464.0-464.9' Silt With Limestone Fragments (ML) 466.5-467.9' - Same as 464.9-465.9' No Recovery 467.9-469.0' Limestone 469.0-473.9' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16" over 20% of rock surface and are fossil molds, moderately fossiliferous, trace organics near top of run No Recovery 473.9-474.0'	R53: 14 minutes
465 -422.7	R54-HQ 5 ft 78%	0	>10	464.3' - Fractures (3), horizontal and vertical, rough, undulating, tight, three intersecting fractures 464.6-465.4' - Fracture zone, rock fragments up to 1-3/16" in diameter 465.6-465.9' - Fracture zone, rock fragments up to 3/4" in diameter 466.2' - Bedding plane, horizontal, rough, undulating, tight 466.5-467.9' - Fracture zone, rock fragments up to 1-9/16" in diameter	[Symbolic Log]		R54: 10 minutes
470 -427.7	R55-HQ 5 ft 98%	44	>10	469.0-469.6' - Fracture zone, multiple high angle, intersecting fractures, rock fragments up to 2-3/8" in diameter 469.9' - Fracture, horizontal, rough, undulating 470.1' - Bedding plane, horizontal, smooth, stepped, intersecting fractures, rock fragments up to 2-3/8" in diameter 470.2' - Fracture, 30 deg, rough, undulating, tight 470.5' - Fracture, 45 deg, rough, undulating, tight 471.75, 472.0, 472.15, 472.75, 473.1' - Fractures (5), horizontal, rough, undulating, except 45 deg at 472.75'	[Symbolic Log]		R55: 12 minutes
475 -432.7	R56-HQ 5 ft 100%	36	>10	474.3' - Fracture, horizontal, rough, undulating, tight 474.7' - Fracture, 30 deg, rough, undulating, tight 474.9' - Fracture, horizontal, rough, undulating 475.3' - Fracture, 30 deg, rough, undulating, tight 475.9' - Fracture, horizontal, rough, undulating, high relief at 3/4" 475.6, 475.9' - Fractures (2), horizontal, rough, undulating, tight 476.4, 475.9' - Fracture zone, horizontal, rough, undulating, tight, rock fragments to 3/4"	[Symbolic Log]		Complete drilling at 17:00 on 09/11/07, water level at surface
480			1		[Symbolic Log]		R56: 15 minutes



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-437.7	R57-HQ 5 ft 96%	37	4	476.75, 477.0, 477.65, 478.0, 478.35' - Fractures (5), horizontal, rough, undulating, tight		Limestone 474.0-479.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16" over 10% of rock surface and are fossil molds, cavities up to 3/8" diameter over 1-2% of rock surface, moderately fossiliferous, secondary mineralization from 478.0-479.0' 479.0-483.8' - yellowish gray to light gray, (5Y 7/2 to N7), very fine to fine grained, mild to strong HCl reaction, medium strong to strong (R3 to R4), with and extremely weak carbonate sandy silt lens from 481.5-481.8', voids up to 3/8" over 10% of rock surface and are fossil molds, trace organics, moderately fossiliferous No Recovery 483.8-484.0' Limestone 484.0-487.8' - light brownish gray, (5YR 6/1), very fine to fine grained, mild to strong HCl reaction, strong (R4), voids up to 3/16" diameter over 20% of rock surface are fossil molds, quartz crystallization at 487.2', 1-9/16" diameter and contains carbonate crystallization No Recovery 487.8-489.0' Limestone 489.0-493.05' - light brownish gray, (5YR 6/1), very fine to fine grained, mild to strong HCl reaction, strong (R4), voids up to 3/16" over 10% of rock surface and are fossil molds, cavities up to 1-3/8" over 1% of rock surface are filled with carbonate crystallization and found from 489.0-490.0', moderately fossiliferous No Recovery 493.05-494.0' Limestone 494.0-498.4' - light brownish gray, (5YR 6/1), very fine to fine grained, mild to strong HCl reaction, medium strong to strong (R3 to R4), carbonate sandy silt, extremely weak rock from 497.3-497.9', voids up to 3/16" over 10% of rock surface and are fossil molds, cavities up to 9/16" diameter over 1% of rock surface and are filled with aragonite crystallization, trace organics No Recovery 498.4-500.0'	R57: 12 minutes	
484.0			>10	478.6-478.8' - Fracture zone, rock fragments up to 1-3/16" in diameter				
			3	479.6, 480.15, 480.45, 480.6, 480.95, 481.25' - Fractures (6), horizontal, rough, undulating, tight				
			>10	481.5-481.8' - Fracture zone, rock fragments to 3/4" diameter				
485			NR	481.9, 482.1, 482.75, 482.95, 483.2, 483.4' - Fractures (6), horizontal, rough, undulating, open to 3/4"				
-442.7	R58-HQ 5 ft 76%	42	>10	482.85' - Fracture, vertical, rough, undulating, tight			SC-9 collected at 485.8-486.85'	
			4	483.55-483.7' - Fracture zone, rock fragments up to 1-3/16" in diameter				
			2	484.0-484.5' - Fracture zone, rock fragments up to 2" in diameter				
			1	484.85, 485.0, 485.3, 485.4, 485.8, 486.9, 487.0' - Fractures (7), horizontal, rough, undulating, tight				
			NR	487.2' - Fracture, horizontal, rough, undulating, open to 3/4"			R58: 11 minutes	
489.0			3	489.2' - Fracture, horizontal, rough, undulating, aragonite crystallization				
490			0	489.45, 489.9' - Fractures (2), horizontal, rough, undulating, tight				
-447.7	R59-HQ 5 ft 81%	64	>10	491.45-491.6' - Fracture zone, rock fragments up to 1-3/16" in diameter				
			1	492.4' - Fracture, horizontal, rough, undulating, tight				
			NR			R59: 12 minutes		
494.0			5	494.2, 494.3, 494.45, 494.75, 495.1, 495.55, 495.9' - Fractures (7), horizontal, rough, undulating, trace brown staining, tight				
495			4	495.65' - Fracture, vertical, rough, undulating, tight, intersecting with horizontal fractures at 495.55 and 495.9'				
-452.7	R60-HQ 6 ft 73%	19	4	496.2, 496.45, 496.65' - Fractures (3), horizontal, rough, undulating, tight				
			>10	497.0' - Fracture, 0-90 deg, rough, undulating to stepped, tight				
			1	497.3-497.6' - Fracture zone, rock fragments up to 3/4", soft material				
			NR	498.15' - Fracture, horizontal, rough, undulating, tight		R60: 10 minutes, 6' run to 500' below ground surface		
500	500.0					9/12/07 at 10:30, total depth at 500.0' below ground surface		
						Bottom of Boring at 500.0 ft bgs on 9/12/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 1 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-157.6	200.0			200.0-200.6' - Fracture, vertical, rough, undulating, open 200.6-201.4' - Fracture zone, angular fragments, 1-3" in size	Limestone 200.0-203.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), trace voids (<1/16") 201.4-201.5' - horizontal black organic laminae 202.8-203.1' - horizontal black organic laminae 203.6-205.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 30% voids (<1/16"), trace casts/cavities (<1/16") 205.0-207.1' - light olive gray to medium gray, (5Y 5/2 to N5), fine grained, moderate HCl reaction, medium strong (R3), trace medium to coarse subrounded fragments 206.5-207.1' - 5 to 10% voids to 1/16", trace cavities up to 3/4 x 1-3/16" 207.1-209.0' - pale yellowish brown to yellowish gray, (10Y 5/4 to 5Y 7/2), fine grained, weak HCl reaction, trace voids to 1/16", strong HCl 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 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 No Recovery 217.0-219.0'	Boring AD-3 blind drilled to approximately 200 feet below ground surface before beginning sampling/logging. "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Logger: C. Sump (limited space in header) Approximately 1.8' of slough (from 0.0-200.0' drilling) removed from top of run R1: 12 minutes 15:25: Segment of R2 clogged, removed for logging and resumed R2 - HQ at 206.5' Driller's Remark: R2 - HQ was a 4.0' run due to blockage in core barrel R2: 14 minutes R3: 15 minutes R4: 16 minutes J. Townes continues logging	
	R1-HQ 5 ft 100%	0	>10	201.7-202.2' - Fracture zone, angular fragments, 1" to 2-1/2" 202.4' - Fracture, horizontal, smooth, undulating, open 202.5-202.7' - Fracture (3), 60 deg, rough, undulating, 1/8" relief 202.9' - Fracture, horizontal, rough, undulating, open 203.1-204.7' - Fracture zone, fragments 1/4-3"			
205	205.0			204.7-205.0' - Fracture zone, fragments 2-3" 205.0-205.5' - Fracture zone, fragments 1/2' to 2" in size 205.5-206.5' - Fracture zone, fragments 1/4-1" in size 205.8, 206.0, 207.1, 207.3, 207.4, 207.5, 207.5, 207.6, 207.7, 207.8, 207.9' - Fractures or bedding plane (11), horizontal, rough, planar to undulating, 1/8" open 208.1, 208.15, 208.2' - Fractures or bedding 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 208.6-209.0' - Fracture zone, fragments 2-3" 209.0-209.85' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8" 210.25' - Bedding plane, horizontal, smooth 210.3' - Fracture, vertical, rough, undulating, <1/16" open 210.4' - Fracture, horizontal, rough, undulating, 3/8" open 210.6' - Fracture, vertical, rough, undulating, <1/16" open 213.0-213.4' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8" 213.6' - Fracture, horizontal, rough, undulating, 3/8" open 214.05' - Fracture, rough, undulating, 3/16" open 214.25-216.15' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-9/16" 216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low relief 216.65-217.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			
-162.6	R2-HQ 4 ft 100%	0	>10	209.0			
				209.0-209.85' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8"			
210	209.0			209.0-209.85' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8"			
-167.6	R3-HQ 4 ft 43%	8	>10	210.25' - Bedding plane, horizontal, smooth 210.3' - Fracture, vertical, rough, undulating, <1/16" open 210.4' - Fracture, horizontal, rough, undulating, 3/8" open 210.6' - Fracture, vertical, rough, undulating, <1/16" open 213.0-213.4' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8" 213.6' - Fracture, horizontal, rough, undulating, 3/8" open 214.05' - Fracture, rough, undulating, 3/16" open 214.25-216.15' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-9/16" 216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low relief 216.65-217.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			
				210.25' - Bedding plane, horizontal, smooth 210.3' - Fracture, vertical, rough, undulating, <1/16" open 210.4' - Fracture, horizontal, rough, undulating, 3/8" open 210.6' - Fracture, vertical, rough, undulating, <1/16" open 213.0-213.4' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8" 213.6' - Fracture, horizontal, rough, undulating, 3/8" open 214.05' - Fracture, rough, undulating, 3/16" open 214.25-216.15' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-9/16" 216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low relief 216.65-217.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			
215	213.0			213.0-213.4' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1/8" 213.6' - Fracture, horizontal, rough, undulating, 3/8" open 214.05' - Fracture, rough, undulating, 3/16" open 214.25-216.15' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-9/16" 216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low relief 216.65-217.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			
-172.6	R4-HQ 6 ft 67%	6	>10	219.0			
				219.0-220.8' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			
220			>10	219.0-220.8' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 2 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-177.6	R5-HQ 5 ft 36%	0	>10		Limestone 219.0-220.8' - yellowish gray to grayish orange pink, (5Y 7/2 to 5YR 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 5% of surface, poorly fossiliferous No Recovery 220.8-224.0'	R5:13 minutes	
224.0		NR					
225 -182.6	R6-HQ 5 ft 58%	12	>10	224.7-224.9' - Fracture, 10 deg, rough, undulating, high relief (3/4") due to fossil molds 225.2-226.9' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"	Limestone 224.0-226.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 60% of surface, cavities up to 3/8" over 10% of surface, fossil molds, moderately fossiliferous No Recovery 226.9-229.0'	R6:5 minutes	
229.0		NR					
230 -187.6	R7-HQ 5 ft 46%	0	>10	229.4' - Fracture, 10 deg, rough, undulating, ~3/32" open, thin black material over 25% of fracture surface 229.55' - Fracture, 10 deg, rough, undulating, <1/16" open 229.7-231.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 231.0' - Fracture, vertical, rough, undulating, ~3/8" open	Limestone 229.0-231.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids up to 1/16" over 20% of surface, cavities up to 3/4" over 1-2% of surface, fossil molds, poorly fossiliferous, trace laminations No Recovery 231.3-234.0'	R7:7 minutes	
234.0		NR					
235 -192.6	R8-HQ 5 ft 30%	8	>10	234.0-234.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16" 234.9-235.5' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-3/16"	Limestone 234.0-235.5' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2), voids <1/16" over 5% of surface, cavities up to 1" over 1-2% of surface, fossil molds, trace laminations, poorly fossiliferous No Recovery 235.5-239.0'	R8:7 minutes	
239.0		NR					
240			>10	239.0-240.0' - Fracture zone, multiple high angle intersecting fractures, rock fragments up to 1-9/16"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 3 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-197.6	R9-HQ 5 ft 24%	0	1		Limestone 239.0-240.2' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, weak (R2), voids up to 3/32" over 30% of surface, fossil molds, poorly fossiliferous, trace laminations No Recovery 240.2-244.0'	R9:7 minutes	
244.0							
245 -202.6	R10-HQ 5 ft 10%	0	>10		Limestone 244.0-244.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 50% of surface, trace laminations, area of oxidized pyrite 3/4", poorly fossiliferous No Recovery 244.5-249.0'	Driller's Remark: Smooth drilling, no loss of resistance or rod drops; incompetent material being ground up and washed out R10:7 minutes	
249.0							
250 -207.6	R11-HQ 5 ft 12%	0	>10		Limestone 249.0-249.6' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), trace laminations, nonfossiliferous No Recovery 249.6-254.0'	R11: 7 minutes	
254.0							
255 -212.6	R12-HQ 5 ft 28%	0	>10		Limestone 254.0-256.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), trace laminations, cavities up to 3/8" over 5% of surface, fossil molds, poorly fossiliferous No Recovery 256.5-259.0'	R12: 7 minutes	
259.0			2				
260			>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 4 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-217.6	R13-HQ 5 ft 22%	0	>10		Limestone 259.0-260.1' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" over 60% of surface, cavities up to 3/4" over 10% surface, fossil molds, moderately fossiliferous No Recovery 260.1-264.0'	R13: 7 minutes	
264.0							
265 -222.6	R14-HQ 5 ft 22%	0	>10		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% surface, few small dissolution cavities (<1x1/2"), trace shell laminae (<1/2"), poorly to moderately fossiliferous Interbedded Silt And Limestone 264.5-264.7' - yellowish gray, (5Y 7/2), dry to moist, nonplastic to low plasticity, moderate to strong HCl reaction, coarse angular fragments, <50% limestone fragments, all carbonate Limestone 264.7-264.95' - Same as 264.0-264.5' Interbedded Silt And Limestone 264.95-265.1' - Same as 264.5-264.7' No Recovery 265.1-269.0'	R14: 6 minutes	
269.0							
270 -227.6	R15-HQ 5 ft 6%	0	10		Limestone 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							
275 -232.6	R16-HQ 5 ft 20%	0	>10		Limestone 274.0-275.0' - yellowish gray, (5Y 7/2), very fine to medium grained, mild HCl reaction, weak to strong (R2 to R4), voids <1/16" over 10% of surface, moderately fossiliferous with fossil cast lenses No Recovery 275.0-279.0'	R16: 6 minutes	
279.0							
280			>10		Limestone 279.0-280.7' - Fracture, <10 deg, rough, fragments <2", intersecting horizontal and vertical fragments		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-237.6	R17-HQ 5 ft 34%	0	>10		Limestone 279.0-280.7' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4) No Recovery 280.7-284.0'	R17: 10 minutes	
284.0			NR				
285 -242.6	R18-HQ 5 ft 62%	12	>10	284.0-284.55' - Fracture zone, rough, undulating, multiple 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		
			>10	284.8' - Bedding plane, 10 deg, rough, undulating	284.9-285.4' - grayish orange pink to yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak to weak (R0 to R2)	R18: 6 minutes	
			>10	285.15' - Fracture, <10 deg, rough, undulating, intersecting fractures	285.5-287.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 20% of surface, trace fossil casts		
			>10	285.2' - Fracture, 55 deg, rough, undulating, intersecting fractures	No Recovery 287.1-289.0'		
			NR	285.25' - Fracture, <10 deg, rough, undulating, intersecting fractures	Limestone 289.0-290.5' - yellowish gray, (5Y 7/2), very fine to medium grained, mild HCl reaction, extremely weak to medium strong (R0 to R3), voids over 15 to 30% of surface (<1/16"), poorly to moderately fossiliferous	R19: 5 minutes	
			NR	285.75' - Fracture or mechanical break, <10 deg, rough, undulating	No Recovery 290.5-294.0'		
			NR	286.4' - Fracture or mechanical break, <10 deg, rough, undulating			
289.0			>10	286.6-287.1' - Fracture or mechanical break, 40 deg, rough, undulating, multiple intersecting fractures			
290 -247.6	R19-HQ 5 ft 30%	0	>10	286.61' - Fracture or mechanical break, <10 deg, rough, undulating			
			NR	289.0-290.5' - Fracture zone, rough, undulating, multiple intersecting fractures, rock fragments <4"x1"			
			NR	290.4' - Fracture, rough, undulating, potential healed fractures, intersecting			
294.0			>10	294.3' - Fracture, 70 deg, rough, undulating	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 infill on clast inclusion	Driller's Remark: Slow rotation to approx. 400 rpm to achieve better recovery in softer material M. Faurote continues logging	
295 -252.6	R20-HQ 5 ft 38%	10	3	294.6-295.0' - Fractures, multiple intersecting fractures, fragments <2"	No Recovery 295.9-299.0'		
			10	295.2' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating			
			NR	295.3' - Fracture or mechanical break, 60 deg, rough, undulating			
			NR	295.8-295.9' - Fracture zone, rough, undulating, >3 fractures intersect		R20: 5 minutes	
299.0			3	299.35' - Mechanical break or bedding plane, <10 deg, smooth to rough			
300							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 6 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-257.6	R21-HQ 5 ft 82%	51	>10	299.45' - Mechanical break or bedding plane, <10 deg, smooth to rough, slickensided 299.7' - Mechanical break or bedding plane, <10 deg, smooth to rough, slickensided 300.4-300.65' - Fracture zone, rough, undulating, gravel sized fragments <2" 301.0-301.1' - Fracture zone, rough, undulating, sand sized fragments 301.5' - Fracture or mechanical break, <10 deg, smooth to rough, undulating 301.9-302.1' - Fracture, <10 deg, smooth to rough, undulating, gravel sized fragments <1" 302.85' - Fracture or mechanical break, <10 deg, rough, undulating 304.0-305.9' - Fracture zone, rough, undulating, gravel sized fragments <2"		Limestone 299.0-299.3' - grayish orange, (10YR 7/4), very fine grained, mild HCl reaction, extremely weak (R0), trace laminations 299.3-299.35' - olive gray, (5Y 4/1), very fine grained, no HCl reaction, extremely weak (R0) 299.35-301.0' - yellowish gray to light olive gray, (5Y 8/1 to 5Y 6/1), very fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), laminated bedding 301.0-303.1' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, laminated bedding, voids <1/16" over 10% of surface No Recovery 303.1-304.0' Limestone 304.0-305.9' - yellowish gray, (5Y 8/1), mottled colorations with trace organics, very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16", poorly fossiliferous No Recovery 305.9-309.0'	SC-1 collected at 302.0-302.8' R21: 7 minutes
305 -262.6	R22-HQ 5 ft 38%	0	>10	309.0-309.7' - Fracture zone, rough, undulating, gravel sized fragments <2" 310.25-310.35' - Fracture zone, rough, undulating, gravel sized fragments <1" 310.8, 311.15, 311.55, 311.95, 312.1' - Bedding plane (5), <10 deg, rough, undulating 312.3-312.8' - Fracture zone, rough, undulating, gravel sized fragments <1"		Limestone 309.0-312.8' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2) 309.0-310.8' - very fine grained, mottled laminations 310.8-312.8' - very fine to fine grained, laminated bedding, with voids (<1/16") over 30% of surface No Recovery 312.8-314.0'	R22: 7 minutes
310 -267.6	R23-HQ 5 ft 76%	33	>10	314.0-315.6' - Fracture zone, rough, undulating, gravel sized fragments <3" 318.0-320.0' - Fracture zone, rough, undulating, gravel sized fragments <2"		Limestone 314.0-315.6' - yellowish gray, (5Y 8/1), very fine to medium grained, moderate HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over 10% of surface No Recovery 315.6-319.0'	R23: 5 minutes
315 -272.6	R24-HQ 5 ft 32%	0	>10				R24: 5 minutes
320			>10				



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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-277.6	R25-HQ 5 ft 30%	0	4		Limestone 319.0-320.5' - yellowish gray, (5Y 8/1), very fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2) No Recovery 320.5-324.0'	R25: 6 minutes	
324.0			NR				
325 -282.6			NA		Silty Sand (SM) 324.0-326.1' - yellowish gray, (5Y 7/2), moist, dense, fine to coarse grained, mild HCl reaction, 40 to 60% carbonate sands, 40 to 60% low plasticity carbonate silts No Recovery 326.1-329.0'	Begin drilling at 8:00 on 8/22/07; water level at 3' below ground surface Driller's Remark: No slough in boring, clean to 324' below ground surface Driller's Remark: Moderate to slow advancement rate; very consistent advancement Driller's Remark: Slow rotation rate to approx. 300 rpm to achieve better recovery in softer material	
	R26-HQ 5 ft 42%	0	NR			R26: 7 minutes	
329.0			NA		Sandy Silt (ML) 329.0-331.3' - yellowish gray, (5Y 7/2), dry to moist, very dense, fine to coarse grained, >50% low plasticity carbonate silts, carbonate sands		
330 -287.6			NA				
	R27-HQ 5 ft 88%	40	2		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 organic laminations No Recovery 333.4-334.0'	R27: 6 minutes	
			2				
			0				
			NR		No Recovery 334.0-339.0'	Driller's Remark: Possible void space; low torque on drill indicating very soft material or no material; no fluid return; fluid return at higher flow rate of approx. 25 gpm and not drilling (approx. 25% circulation)	
334.0			NR				
335 -292.6			NR			R28: 7 minutes	
	R28-HQ 5 ft 0%	0	NR				
					No Recovery 339.0-342.0'		
339.0							
340							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-297.6	R29-HQ 5 ft 34%	0	NR			Driller's Remark: Clogging in core barrel; tag total depth at 341' below ground surface with cutting bit pulled; core barrel is open, but rock fragments may be rolling under the bit causing no recovery or possible void; felt rock fragment break loose or move out of the way; 2' of recovery from 342 to 344' R29: 6 minutes	
			NA		Sandy Silt (ML) 342.0-343.4' - yellowish gray, (5Y 7/2), moist to wet, soft to stiff, fine to coarse grained, moderate HCl reaction		
			NA		343.4-343.7' - bluish gray, yellowish gray, (5B 7/1, 5Y 7/2), moderate HCl reaction, weak (R2)		
345 -302.6	R30-HQ 5 ft 74%	32	7		No Recovery 343.7-344.0' Silt (ML) 344.0-344.3' - brown to orange gray, carbonate grains	R30: 7 minutes	
			>10		Limestone 344.3-345.7' - very fine to coarse grained, strong HCl reaction, very weak (R1), bedded at 345.7'		
			3		345.7-347.4' - light gray, (N8), very fine grained, strong HCl reaction, medium strong (R3), pyrite mottling		
350 -307.6	R31-HQ 5 ft 98%	56	>10		Silt (ML) 347.4-347.7' - compact, carbonate	R31: 6 minutes	
			>10		No Recovery 347.7-349.0' Limestone 349.0-350.5' - light gray to white, (N8 to N9), very fine grained, strong HCl reaction, medium strong (R3)		
			3		350.5-352.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak (R1), laminated bedding, trace organics, trace pyrite		
355 -312.6	R32-HQ 5 ft 100%	24	2		352.0-354.0' - white, light gray, yellowish gray, (N9, N8, 5Y 8/1), very fine grained, strong HCl reaction, weak (R2), trace iron, pyrite	R32: 8 minutes	
			2		Sandy Silt (ML) 354.0-354.4' - pinkish gray, (5YR 8/1), carbonate derived, friable		
			0		Limestone 354.4-354.8' - pale orange, (10YR 8/2), strong HCl reaction, weak (R2), <10% voids <1/16"		
			>10		Silt (ML) 354.8-356.0'		
			>10		Limestone 356.0-358.2' - pale orange, (10YR 8/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 15-18% voids <1/8"		
			>10		358.2-358.3' - Fracture zone or bedding plane, 0-60 deg, random fractures, multiple sizes		
			2		358.4' - Fractures, 75 deg and 60 deg, smooth, intersecting		
360					359.4' - Bedding plane, rough, undulating		



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-317.6	R33-HQ 5 ft 82%	50	>10	359.95' - Bedding plane, rough, undulating 360.2-360.4' - interbedded, generally horizontal 360.95' - Mechanical break		Limestone 358.2-361.1' - pale orange, (10YR 8/2), very fine grained, weak to medium strong (R2 to R3), 20% voids (<1/16"), fossiliferous 361.1-361.3' - very fine grained, transition zone, irregular, convoluted surface, laminar, horizontal bedding, organic interbedding, rip-up clasts 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 (1/16 to 3/8") over 10 to 15% of the surface, faint bedding No Recovery 363.1-364.0' Limestone 364.0-364.25' - pale orange, (10YR 8/2), trace mottling, very fine grained, moderate to strong HCl reaction, weak (R2), fossil casts (1/16 to 3/8") over 10 to 15% of the surface, faint bedding 364.25-364.9' - pale orange, (10YR 8/2), very fine grained, strong HCl 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) 364.9-366.15' - grayish orange, (10YR 7/4), very fine grained, strong to very strong HCl reaction, medium strong (R3), trace organics as laminae at top of interval 366.15-368.2' - white, pale orange, (N9, 10YR 8/2), very fine grained, medium strong to strong (R3 to R4), 20% burrows, molds, and 5% voids (<1/16"), trace organics 368.2-368.6' - pale orange, (10YR 8/2), very fine grained, very weak to weak (R1 to R2), granular, 1/8" organic layer at 368.3', few voids, few cavities Limestone 369.4-370.5' - white to pale orange, (N9 to 10YR 8/2), very fine grained, strong HCl reaction, medium strong (R3), trace organics, burrows and molds create cavities to 1/2", 10% voids (<1/16") 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'	SC-2 collected at 361.75-362.65'	
364.0		NR	>10	361.5' - Fracture or bedding plane, horizontal and vertical, rough, undulating 361.6' - Fracture or bedding plane, horizontal and vertical, rough, undulating 361.7' - Fracture or bedding plane, horizontal and vertical, rough, undulating 362.7-363.1' - Fracture zone, smooth to rough, undulating, multiple fragments, no visible orientations			R33: 6 minutes	
365 -322.6	R34-HQ 5 ft 100%	52	7	364.25-364.45' - Bedding plane, smooth, undulating 364.7' - Fracture, 85 deg and vertical, rough, undulating 364.9' - Bedding plane, horizontal, smooth, contact, with 45 deg fracture 366.2' - Bedding plane, rough, contact very irregular 366.9-368.0' - Fracture zone, smooth, undulating, irregular contact with uneven surfaces			R34: 6 minutes	
369.0		NR	1	368.7' - Bedding plane, horizontal				
370 -327.6	R35-HQ 5 ft 74%	44	>10	369.35-369.8' - Fracture zone or bedding plane, 0-90 deg, smooth to rough, planar to undulating, iron oxides and trace organics 370.1' - Fractures, horizontal and 8 deg, rough, undulating 370.6-370.7' - Fracture zone 371.5' - Mechanical break 371.9' - Mechanical break 372.6' - Mechanical break		R35: 5 minutes		
374.0		NR						
375 -332.6	R36-HQ 5 ft 66%	12	>10	374.0-374.3' - Fracture zone, fragments 1/4" to 3/4" 374.3' - Bedding plane, horizontal and 5 deg, smooth, undulating 374.4' - Bedding plane, horizontal and 5 deg, smooth, undulating 374.6' - Bedding plane, horizontal and 5 deg, smooth, undulating 374.85' - Fracture, 20 deg, rough, undulating 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 376.6-376.8' - Fracture zone, trace iron oxide staining		R36: 7 minutes		
379.0		NR						
380		2						



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-337.6	R37-HQ 5 ft 82%	18	5	380.1, 380.2, 380.45' - Bedding plane (3), horizontal	[Symbolic Log]	Limestone 374.0-374.45' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, very weak (R1), laminated bedding, organic interbedding 374.45-377.3' - yellowish gray, (5Y 8/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 25 to 35 % burrows, cavities (molds), 5 to 10% voids (<1/16"), locally heavily fractured No Recovery 377.3-379.0' Limestone 379.0-381.75' - grayish orange, (10YR 7/4), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), nonreactive granular material, localized laminated bedding with trace organics 381.0-381.3' - extremely weak (R0), friable, dissembles in water 381.75-383.1' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, medium strong (R3), 10% voids (<1/8") 382.7-383.1' - very weak to weak (R1 to R2) No Recovery 383.1-384.0' Limestone 384.0-384.5' - yellowish gray, (5Y 7/2), very fine grained, very strong HCl reaction, extremely weak (R0) 384.5-387.0' - grayish orange, (10YR 7/4), very fine grained, strong HCl reaction, medium strong (R3), 20% <1/16" voids, trace organics, cavities to 3/4" 387.0-388.8' - light gray, light blue gray, (N7, 5B 7/1), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 25% fossil casts (1/16 to 9/16" max.) of forams, pelecypods, and echinoderms No Recovery 388.8-389.0' Limestone 389.0-393.7' - grayish orange, very pale orange (392.0'), (10YR 7/4, 10YR 8/2), strong HCl reaction, extremely weak to very weak (R0 to R1), fracture zone, breccia begins at 390.5', 15-18% voids (<1/16") in rock fragments No Recovery 393.7-394.0' Limestone 394.0-395.8' - Same as 389.0-393.7' 395.6' - becomes tacky, heavy silt content No Recovery 395.8-399.0'	R37: 6 minutes	
			4	380.8, 380.9' - Mechanical break (2) 381.05' - stepped fracture over 3/4", angular 381.4' - Bedding plane, smooth, undulating, stepped				
			4	381.7, 381.9, 382.15, 382.6' - Bedding plane (4), smooth, undulating 382.7, 382.9' - Bedding plane (2), rough, undulating				
			NR					
384.0								
385	R38-HQ 5 ft 96%	39	8	384.2, 384.4, 384.5, 384.7' - Bedding plane or mechanical break (4)	[Symbolic Log]		SC-3 collected at 387.8-388.8' R38: 7 minutes	
-342.6			6	384.9' - mid point of vertical fracture along center of core				
			>10	385.05, 385.2, 385.7, 385.9' - rough, multiple fragments, angular to spike random angles 386.0' - Fracture, 20 deg 386.6-387.5' - Fracture zone, multiple fragments up to 2", crosses lithology change				
			>10	387.8' - Bedding plane, 10 deg, smooth, undulating				
			0					
389.0								
390	R39-HQ 5 ft 94%	27	4	389.05' - Mechanical break 389.4-389.5' - Bedding plane, horizontal and 5 deg, smooth, undulating, silt/clay infill	[Symbolic Log]		R39: 8 minutes	
-347.6			2	390.5-391.5' - Fracture zone, fragments to 2", subangular to angular, 40-60% infill <1"				
			2	391.5-391.8' - Bedding plane, horizontal, smooth, undulating, rock partings on both ends				
			1	391.8-392.6' - Fracture zone, fragments to 1-1/2", subangular to angular				
			>10	392.9' - Bedding plane, smooth, undulating, contact rock with silt/sand				
394.0								
395	R40-HQ 5 ft 36%	0	>10	393.4-393.7' - Fracture zone, fine infill, angular fragments to 1"	[Symbolic Log]		R40: 6 minutes	
-352.6			>10	394.0-394.55' - Fracture zone, fractures from horizontal to vertical, immediately below 3/8" gravel sized fragments, clay/silt rock fragments to end of run				
			NR					
399.0								
400			1	399.65' - Bedding plane, smooth, horizontal				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 11 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-357.6	R41-HQ 5 ft 88%	67	2	400.0' - Fracture, horizontal, rough, undulating	Limestone 399.0-399.25' - very pale orange, (10YR 8/2), moderate HCl reaction, very weak (R1), 30% voids (<1/8") (fossil molds), sand-sized grains, fossil fragments 399.25-403.4' - yellowish gray, (5Y 8/1), mild to strong HCl reaction, weak (R2), trace iron oxides on shell casts, 15% <1/16" voids with sporadic fossil casts to 1/4" No Recovery 403.4-404.0'	SC-4 collected at 401.5-402.65' R41: 6 minutes	
1			400.1' - Fracture, vertical, rough, undulating				
1			401.0' - Mechanical break				
1			402.7' - Fracture, 45 deg, planar				
404.0			NR				
405	R42-HQ 5 ft 99%	86	2	404.1' - Bedding plane, 5 deg, undulating	Limestone 404.0-408.95' - grayish orange pink, (5YR 7/2), fine to medium grained, moderate HCl reaction, very weak (R1), HCl reaction delayed, brecciated at 410.2-410.35'	R42: 6 minutes	
-362.6			1	404.85' - Fracture, 15 deg, smooth, planar			
			1	405.05' - Bedding plane or mechanical break, core contacts spun against each other			
			2	406.65' - Bedding plane, horizontal and 5 deg, smooth, undulating			
			1	407.05' - Bedding plane, 10 deg, smooth, planar			
409.0			NR	407.75' - Mechanical break			
410	R43-HQ 5 ft 60%	14	>10	408.85' - Mechanical break, probably when breaking core run off bottom	No Recovery 408.95-409.0' Limestone 409.0-411.3' - Same as 404.0-408.95'	R43: 7 minutes	
-367.6			>10	409.7-410.0' - Mechanical break, undulating, heavily fractured near vertical planes, probably mechanically induced			
			>10	410.3' - Fracture, 40 deg and 45 deg, zone infilled with 1/8" or less rock fragments in silt matrix			
			NR	410.6-412.0' - Fracture zone, horizontal and vertical, multiple fragments of varying size ranging to 3"x1-1/2"x1", organic (coatings) on planar surfaces and lining casts from 411.3-412'			
414.0							
415	R44-HQ 5 ft 89%	57	5	414.15' - Bedding plane, horizontal, smooth, planar	Limestone 414.0-414.6' - very pale orange, (10YR 5/2), very fine grained, very strong HCl reaction, weak (R2), 5% (<1/16") voids on surface, trace organics Conglomerate 414.6-414.8' - strong HCl reaction, variegated, silica gravel up to 3/8", limestone grains Limestone 414.8-418.45' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 5 to 20% (<1/16") voids, fossil molds, some including cavities up to 1/2", trace organic material No Recovery 418.45-419.0'	R44: 8 minutes	
-372.6			3	414.4' - Fracture, vertical and 60 deg			
			2	414.6' - Bedding plane, rough, undulating			
			2	414.95, 415.2, 415.5, 415.8' - Mechanical break (4)			
			2	416.4' - Mechanical break, horizontal			
			1	416.8' - Fracture, 65 deg, planar to undulating, 1/16" separation			
419.0			NR	417.15, 417.25' - Fracture (2), horizontal and 80 deg, 1/16" to 1/16" separation			
420			1	418.4' - Bedding plane, smooth, undulating			
				419.2' - Bedding plane, probable organic stain and/or infill			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 12 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-377.6	R45-HQ 5 ft 96%	65	1	419.75' - Mechanical break	Peat 419.0-419.2' - brownish black, (5YR 2/1), malleable Limestone 419.2-421.8' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction, medium strong (R3), fossil mold rich, 25% (<1/16") voids, trace organics 421.8-423.8' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine grained, moderate to strong HCl reaction, medium strong to weak (R3 to R2), voids (<1/16") over 10-15% of surface, 3-8% cavities (1" x 1/4"), weak (R2) rock (last 1' of interval), trace organics, laminar interbeds with fossil coatings No Recovery 423.8-424.0' Limestone 424.0-428.3' - Same as 421.8-423.8'	R45: 9 minutes	
2			421.3' - Fracture, vertical, smooth, undulating 421.7-422.5' - Bedding plane or fracture zone, rough, undulating, irregular contact with uneven surfaces				
>10			423.1' - Mechanical break 423.4-423.8' - Fracture zone, horizontal and vertical, rough, undulating, may be extensively broken from/by breaking core for retrieval				
424.0	R46-HQ 5 ft 100%	86	NR	424.9' - Mechanical break	No Recovery 423.8-424.0' Limestone 424.0-428.3' - Same as 421.8-423.8' 428.3-433.3' - very pale orange, (10YR 8/2), very fine grained, moderate to strong HCl reaction, very weak (R1), voids (1/16"-1/8") over <10% of surface, 1/16"-3/16" fossil casts, at 428.3-429.0' vertical channel-like voids (1/2"-1-1/2" wide)	R46: 8 minutes Driller's Remark: Lost circulation at 428.2-429.3'	
425			1	425.4' - Fracture, rough, undulating, angular 425.65' - Bedding plane, 5 deg and 15 deg, undulating, organic infilling			
-382.6			2	426.45' - Bedding plane or mechanical break 426.5' - Mechanical break, 10 deg and vertical, undulating, short			
429.0			4	426.7' - Bedding plane, trace organic staining, open to 1"			
430			2	427.3' - Bedding plane, rough, undulating, open channel interface			
			3	427.6' - Fracture, rough, undulating, 1/16" opening			
-387.6	R47-HQ 5 ft 98%	50	3	428.05, 428.2, 428.7' - Bedding plane (3), organic infill, stains	Peat 433.3-433.9' - black to dark brown black, (N1 to 5YR 2/1), laminated to thin bedding, organic and silt No Recovery 433.9-434.0' Peat 434.0-434.65' - Same as 433.3-433.9' Limestone 434.65-435.7' - limestone fragments, variegated, random size and type in variable matrix, trace to some organics 435.7-436.5' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, very strong (R5), voids (<1/16") over 5-10% of surface, angular cavities (1/2 to 3/4") and open	R47: 9 minutes SC-5 collected at 430.5-431.55'	
434.0			3	429.2, 429.45, 429.8, 430.1' - Bedding plane (4), smooth, planar to undulating			
435			1	430.2' - Fracture, organic or iron oxide healed, 1/16"			
			1	430.35, 430.5, 431.55, 434.55, 434.7' - Bedding plane (5), smooth, planar to undulating			
-392.6			2	432.3' - Mechanical break			
439.0	R48-HQ 5 ft 88%	22	2	434.55, 434.7' - Bedding plane, between rock and clay or organic detritus	R48: 12 minutes		
			1	435.65' - Bedding plane, rough, undulating			
			3	436.2' - Bedding plane, horizontal and 7 deg, rough, undulating, fossil cast openings			
			>10	436.4' - Bedding plane, smooth, undulating, rock with silica rich gravel			
440	NR	NR	1	436.75' - Fracture, 35 deg and vertical, smooth, filled with carbonate fragments and silty clay			
			1	436.9-437.7' - Fracture zone, multiple fragments up to 1-1/2" some organic infill and stain			
			1	438.0' - Mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-397.6	R49-HQ 5 ft 94%	42	3	439.9, 440.5, 441.0' - Mechanical break (3)	Peat 436.5-436.6' - brownish black, (5YR 2/1), platy, malleable, parting tendencies, HCl reaction on parting surfaces Conglomerate 436.6-436.95' - strong HCl reaction, extremely weak (R0), variegated, limestone fragments (1/2"x3/8") and silica grains (up to 5/16"), trace organics, angular silica Limestone 436.95-437.5' - grayish orange, (10YR 7/4), very fine grained, moderate HCl reaction, medium strong (R3), thin bedding, 5 to 10% discontinuous organic stringers and blebs 437.5-437.7' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction, extremely weak (R0), laminated bedding, organic partings, undulant to scour like bedding 437.7-438.4' - moderate orange pink, (5YR 8/4), very fine grained, mild HCl reaction, weak (R2), voids (1/16") over <5% of surface, trace organics, fossil molds infilled, recrystallized carbonate minerals No Recovery 438.4-439.0' Limestone 439.0-441.25' - yellowish gray, (5Y 7/2), very fine grained, very strong HCl reaction, very strong (R5), 5-10% blebs and stringers of organic material, voids (<1/8") over 5% of surface, 1-1/2 x 1/2" cavities, lined or partially lined with calcite Peat 441.25-441.5' - black, (N1), above carbonate derived silt Limestone 441.5-443.7' - pale brown to pale yellowish brown, (5Y 5/2 to 10YR 6/2), moderate HCl reaction, extremely weak to very weak (R0 to R1), limestone fragments, trace organics No Recovery 443.7-444.0' Peat 444.0-444.1' - black, (N1), amorphous Limestone 444.1-448.6' - light brown, (5YR 5/6), very fine to fine grained, mild to moderate HCl reaction, very weak to strong (R1 to R4), voids (<1/8") over 15% of surface No Recovery 448.6-449.0'	R49: 10 minutes	
			4	441.25, 441.4' - Bedding plane (2), rough, planar, 1/16" open 441.6' - Bedding plane, 60 deg, rough, planar, 1/16" open, planar fracture with organic material as sporadic blebs 442.2-444.0' - Fracture zone, very strongly broken rock fragments in silty sand or sandy silt			
			>10				
			>10				
444.0			NR				
445 -402.6	R50-HQ 5 ft 92%	8	2	444.6, 444.95' - Bedding plane (2), rough, stepped to undulating, fragmented separations 445.3' - Fracture, 75 deg, rough, irregular, trace organics 446.1-446.3' - Fracture, vertical, multiple small fractures throughout	Limestone 446.3-448.6' - light brown, (5YR 5/6), very fine to fine grained, mild to moderate HCl reaction, very weak to strong (R1 to R4), voids (<1/8") over 15% of surface No Recovery 448.6-449.0'	R50: 8 minutes	
			2				
			>10				
			>10				
			>10				
449.0			NR				
450 -407.6	R51-HQ 5 ft 52%	8	>10	449.0-450.1' - Fracture zone, random orientations, fragments to 2-1/2" x 2"	Limestone 449.0-450.1' - Fracture zone, random orientations, fragments to 2-1/2" x 2" 450.6' - Fracture, 70 deg, rough, planar 450.7-454.0' - Bedding plane or fracture zone, smooth, undulating Peat 454.0-454.6' - Fracture zone 454.8, 454.95' - Fracture (2), 15 deg and 30 deg, rough, undulating, recrystallized 455.15, 455.6' - Bedding plane (2), smooth, planar 455.7' - Fracture, 75 deg, undulating to planar 457.2-459.0' - Bedding plane or fracture zone, horizontal, smooth, undulating 459.0-460.0' - Fracture zone, fragments to 3"x2"x1"	R51: 13 minutes	
			>10				
			>10				
454.0			NR				
455 -412.6	R52-HQ 5 ft 58%	20	>10	454.0-454.6' - Fracture zone	Limestone 454.0-454.6' - Fracture zone, horizontal, smooth, undulating 454.8, 454.95' - Fracture (2), 15 deg and 30 deg, rough, undulating, recrystallized 455.15, 455.6' - Bedding plane (2), smooth, planar 455.7' - Fracture, 75 deg, undulating to planar 457.2-459.0' - Bedding plane or fracture zone, horizontal, smooth, undulating 459.0-460.0' - Fracture zone, fragments to 3"x2"x1"	R52: 12 minutes	
			2				
			>10				
			>10				
459.0			NR				
460			>10	459.0-460.0' - Fracture zone, fragments to 3"x2"x1"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 14 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-417.6	R53-HQ 5 ft 84%	0	5	460.3, 460.4, 460.6, 460.65, 460.95' - Mechanical break or bedding plane (5), 60 deg, trace organic staining	Limestone 449.0-451.5' - yellowish gray, (5Y 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 No Recovery 451.5-454.0' Peat 454.0-454.1' - brown black, (5YR 2/1) Limestone 454.1-456.9' - light brown to pale yellowish brown, (5YR 6/4 to 10YR 6/2), very fine grained, mild to very strong HCl reaction, very strong (R5), voids (<1/16") over 5-8% of surface, trace cavities (1/2" x 1/4"), trace organics No Recovery 456.9-459.0' Silt (ML) 459.0-459.2' - with subrounded gravel to 1/2" Limestone 459.2-461.8' - moderate yellow brown, (10YR 5/4), very fine to fine grained, mild to strong HCl reaction, very weak to weak (R1 to R2), thin bedding, voids (<1/16") over 10-15% of surface Fine Sand (SP) 461.8-462.0' - dusky yellow, (5Y 6/4), carbonate Limestone 462.0-462.75' - moderate yellow brown, (10YR 5/4), very fine to fine grained, mild to strong HCl reaction, very weak to weak (R1 to R2), thin bedding, voids (<1/8") over 10-15% of surface Silty Sand (SM) 462.75-463.0' - very fine grained, carbonate Limestone 463.0-463.2' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, very weak (R1), small blebs of black organics throughout No Recovery 463.2-464.0' Limestone 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 strong (R3), thin bedding, irregular bedding	R53: 14 minutes	
464.0			>10	461.3' - Fracture, 60 deg, rough, undulating, intersecting			
465			>10	461.7-462.0' - Fracture zone, 60 deg, rough, undulating, angular			
-422.6			2	462.1' - Bedding plane, smooth			
465	R54-HQ 5 ft 86%	17	NR	462.4, 462.6' - Fracture (2), 45 deg, undulating, one healed is parallel to these, tight	R54: 13 minutes		
469.0			2	462.8' - Fracture, 85 deg, rough, undulating			
470			>10	463.2' - Fracture, 30 deg and vertical, smooth, undulating			
-427.6			>10	463.3' - Fracture, vertical, smooth, undulating			
474.0			>10	464.1' - Fracture, 45 deg, rough, undulating			
470			>10	464.6' - Mechanical break, 10 deg, core pieces spun against each other			
470	R55-HQ 5 ft 90%	31	NR	465.1' - Fracture zone, 70 deg, rough, planar, may extend to 496' with multiple fragments between	R56: 9 minutes		
474.0			>10	466.0-467.0' - Fracture zone, fragments to 2", sporadic organic staining			
475			>10	467.8' - Fracture, 15 deg, rough, undulating, angular			
-432.6			2	468.0' - Fracture, 20 deg, rough, undulating, angular			
479.0			2	469.3' - Bedding plane, rough, stepped to planar, organic staining locally			
480			5	469.6' - Bedding plane, rough, stepped to planar, organic staining			
475	R56-HQ 5 ft 94%	24	NR	470.05' - Bedding plane, smooth, undulating, contact	R56: 9 minutes		
479.0			>10	470.4' - Fracture, 45 deg, smooth, planar, intersecting, fractures at a bedding plane parting with veneer to laminar bedded black (organic) material			
480			2	471.05' - Fracture, rough, irregular, trace organics			
			2	471.1-471.5' - Fracture zone, stepped, irregular, fracture along suture type material			
			NR	471.9' - Bedding plane, stepped to undulating			
			4	472.55' - Fracture, horizontal, rough, undulating			
	>10	472.8' - Fracture, 60 deg, smooth, undulating, trace organics					
	3	473.3' - Fracture, 15 deg, rough, undulating					
	3	474.6' - Fracture, vertical, rough, planar					
	3	474.95' - Fracture, vertical, rough, undulating, angular					
	2	475.2-476.1' - Fracture zone					
	NR	476.5' - Fracture, 15 deg, rough, undulating, angular					
	>10	476.7' - Fracture, 75 deg, rough, undulating					
		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					
		477.9' - Fracture, 85 deg, rough, undulating					



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 15 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-437.6	R57-HQ 5 ft 74%	26	>10	478.15' - Fracture, 60 deg, smooth, planar	[Symbolic Log]	Limestone 466.1-468.3' - dusky yellow, (5Y 6/4), very fine to medium grained, mild to moderate HCl reaction, extremely weak to strong (R0 to R4), granular, voids (<1/16") over 18-20% of surface No Recovery 468.3-469.0' Limestone 469.0-470.15' - Same as 466.1-468.3' 470.15-471.5' - light brown, (5YR 6/4), very fine grained, moderate to strong HCl reaction, weak (R2), laminated to very thin bedding, black beds, lenticels and lenses, at 470.45' and 471.0' beds to 1/4" 471.5-482.25' - light brown, (5YR 5/6), very fine to fine grained, weak to very strong HCl reaction, very weak to medium strong (R1 to R3) No Recovery 473.7-474.0' Limestone 475.2-475.8' - limestone fragments in carbonate silt, fracture or cavity infill, fragments subangular to subrounded, 15% voids (<1/8") and fossil molds (up to 3/8") Breccia 477.0-477.6' - sand and silt matrix No Recovery 478.7-479.0' Limestone 482.85-487.7' - grayish orange, dark gray, (10YR 8/2, N3), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/8") over 5-15% of surface, fossil molds filled or partially infilled with aragonite/calcite, cavities range to greater than width of core and over 2" high, trace organics (shells or shell fragments) No Recovery 482.7-484.0' Limestone 487.7-491.7' - dusky yellow to light brown with 1 to 2" grayish orange, (5YR 6/4 to 10YR 7/4), very fine to fine grained, mild to strong HCl reaction, very weak to medium strong (R1 to R3), voids (<1/16") over 15-30% of surface, solution cavities (1/2" to 2-1/2"x2") No Recovery 488.75-489.0' Limestone 490.1-492.0' - numerous thin dissolution cavities subparallel to bedding 491.5-497.0' - extremely weak to very weak (R0 to R1), 1/4" black organic bed at/near contact	Driller's Remark: Lost circulation on this run, water column dropped to 50' below top of casing R57: 6 minutes	
484.0			>10	479.0-481.0' - Fracture zone, 60 deg, random fragments 1/2 to 2", 480.7-481.6' is single fragment with fracture				
485			0	481.0-481.3' - Fracture zone, random angles, sizes from 1/4" to 2", average about 3/8"				
-442.6			1	482.2' - Bedding plane, 0-5 deg, smooth, undulating				
485	R58-HQ 5 ft 95%	43	NR	484.3' - Mechanical break, 15 deg, smooth, undulating	[Symbolic Log]	Driller's Remark: Lost circulation in large cavity where the two opposing fragments do not match indicating the cavity exceeds the apparent volume R58: 10 minutes		
489.0			3	484.55' - Mechanical break, 15 deg, smooth, undulating				
490			1	484.75' - Bedding plane, 30 deg, smooth, undulating				
-447.6			3	485.8' - Mechanical break				
490			>10	486.2' - Fracture, edges do not match, could be up to 0.3' separation				
494.0			>10	486.7' - Mechanical break or bedding plane, smooth, undulating				
490	R59-HQ 5 ft 82%	19	NR	487.6-488.3' - Fracture zone, fragments from 1/8" to 1"	[Symbolic Log]	SC-6 collected at 492.2-493.15' R59: 10 minutes		
494.0			9	488.4' - Fracture, 65 deg, rough, planar, flat				
495			6	489.05, 489.35, 489.5, 489.6' - Bedding plane (4), smooth, flat				
-452.6			5	489.75, 489.85' - Bedding plane (2), 65 deg, rough, planar				
495			1	489.9, 490.0, 490.15, 490.3, 490.6, 490.85, 491.05, 491.3, 491.5, 491.68, 491.9' - Bedding plane (11), smooth, flat				
495			NR	492.15' - Fracture, 20 deg, rough/smooth, undulating				
495			2	494.6' - Fracture, 15 deg, smooth, undulating				
500			4	494.9, 495.0, 495.15, 495.3, 495.9' - Fracture (5), horizontal and 10 deg, smooth, undulating				
500			2	496.1' - Bedding plane, horizontal, smooth, planar, lithology change				
500			2	496.5' - Mechanical break				
500	R60-HQ 6 ft 92%	62	2	497.5' - Fracture, rough, planar, angular, stepped	[Symbolic Log]			
500			2	497.95' - Fracture, 55 deg, rough, planar, gently arcuate				
500			1	498.4' - Fracture, horizontal and 20 deg, rough, irregular				
500			NR	498.75' - Fracture, 45 deg, rough, planar				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-03	SHEET 16 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone 491.7-500.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR 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</p> <p>No Recovery 493.1-494.0' Limestone 495.35' - very weak to medium strong (R1 to R3), wavy to undulant silt sized laminae with organic interbeds, <1/2" total thickness</p> <p>496.2' - very weak to medium strong (R1 to R3), wavy to undulant silt sized laminae with organic interbeds, <1/2" total thickness</p> <p>498.45' - very weak to medium strong (R1 to R3), wavy to undulant silt sized laminae with organic interbeds, <1/2" total thickness</p> <p>No Recovery 499.5-500.0' Bottom of Boring at 500.0 ft bgs on 8/24/2007</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-157.4					No Recovery 200.0-212.0'	Boring AD-4 blind drilled to approximately 200 feet below ground surface before beginning sampling/logging. "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" 8/26-8/29/07: Sonic casing at 200.0' below ground surface, attempt advancement of HQWL with only 2.5' of advancement, no recovery of material and two rock coring bits (#636) destroyed 9/5/07: Sonic rig setup on AD-4, advances sonic 4" core barrel from 202.5-207.5' below ground surface, no recovery of material due to broken HQWL bit plugging Sonic core barrel; no voids noted; HQWL bit removed, advance 207.5-213' below ground surface	
205 -162.4							
210 -167.4							
212.0	R1-HQ 2 ft 50%	0	>10		Limestone 212.0-213.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to strong (R2 to R4), voids <1/16" over 30% of surface, poorly fossiliferous with few fossils <1/4" diameter, no organics, no cavities	Advance Sonic 4" casing to 213' below ground surface; retrieve 5.0' of crushed limestone fragments and limestone core segments, 4" long each; no void space; set Sonic 6" casing to 210.0' below ground surface; R1: 13 minutes	
214.0			NR				
215 -172.4	R2-HQ 2 ft 100%	33	2		No Recovery 213.0-214.0' 213.0-214.0' Limestone 214.0-216.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 10-40% of surface decreasing with depth, few cavities, poorly to moderately fossiliferous with fossil casts <1/4" diameter, trace laminated bedding	9/6/07: Begin rock coring after advancing HWT casing to 2.38' below ground surface, 1.0' material inside casing to 212.0', core blockage at 214.0' bgs due to fragment locking in sample barrel; no further advancement for R1, limestone inside casing to 212.0'; SC-1 collected at 214.0-214.8' R2: 5 minutes	
216.0			>10				
			1				
	R3-HQ 5 ft 90%	56	3				
			>10				
220							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-177.4			>10	219.4-219.85' - Fracture zone, rough, undulating, limestone fragments <2" diameter	Limestone 216.0-221.0' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), voids <1/16" over 10-30% of surface, variable, moderately fossiliferous with several fossil casts/molds <1/2" diameter, few cavities <1", trace organic laminations No Recovery 220.5-221.0' Limestone 221.0-223.6' - yellowish gray to light gray, (5Y 7/2 to N7), very fine to medium grained, strong HCl reaction, very weak to strong (R1 to R4), strength decreasing with depth, voids <1/16" over <10-25% of surface, few cavities up to 2"x1", poorly to moderately fossiliferous 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" diameter, rough, calcareous silt No Recovery 223.6-226.0' Limestone 226.0-229.9' - yellowish gray, (5Y 7/2), very fine to fine grained, weak HCl reaction, very weak to weak (R1 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 dissolution fossil molds; trace laminations, fossiliferous No Recovery 229.9-231.0' Limestone 231.0-233.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" cover 10% of rock surface, poorly fossiliferous No Recovery 233.0-236.0' Limestone 236.0-239.2' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/8" 20% of rock surface, poorly fossiliferous, trace organics No Recovery 239.2-241.0'	Consistent slow to moderate drilling rate with approx. 50% circulation return; circulated mud is losing to formation through 4" HWT's, 6" sonic casing gap SC-2 collected at 218.3-219.15' R3: 9 minutes R4: 5 minutes R5: 10 minutes Driller's Remark: Rapid advancement at 232.0-233.0' and 234.0-235' due to possible void space or unconsolidated material R6: 3 minutes SC-3 collected at 237.2-238.0'	
	221.0		NR	219.85, 220.3' - Bedding plane (2), 30 deg and 70-90 deg, rough, undulating			
	R4-HQ 5 ft 52%		3	220.3' - Fracture zone, rough, undulating, limestone fragments <2" diameter			
			3	221.75-221.9' - Fracture or mechanical break (2), <30 deg, rough, undulating, 3 fractures			
			>10	222.15' - Fracture or mechanical break, <10 deg, rough, undulating, 3 fractures			
			NR	222.25' - Fracture or mechanical break, 40 deg, rough, undulating 222.5' - Bedding plane or mechanical break, rough, undulating			
225 -182.4			NR	223.2-223.35' - Fracture zone, rough, undulating, silt lens, limestone fragments <1" diameter with silt lens			
	226.0		>10	226.3-226.9' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-9/16" diameter			
	R5-HQ 5 ft 78%		>10	226.95, 227.0, 227.1' - Fractures (3), 60 deg, rough, undulating, three intersecting fractures Y shaped, moderate relief (~3/8")			
			4	227.25' - Fracture, 30 deg, rough, undulating, ~3/8" relief, fossil molds			
			4	227.7-227.9' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" diameter			
			NR	228.3' - Fracture, 30 deg, rough, undulating, relief ~3/8" 228.5' - Fracture, 80 deg, rough, undulating, low relief			
230 -187.4			>10	228.65, 229.0, 229.35' - Bedding plane (3), 80 deg, rough, undulating, stepped, low relief			
	R6-HQ 5 ft 40%		>10	229.8-229.9' - Fracture zone or mechanical break			
			NR	231.0-231.9' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" diameter			
			NR	232.15' - Fracture, 50 deg, rough, undulating, 3/8" relief 232.3-232.4' - Fracture zone			
			NR	232.55' - Fracture, 60 deg, rough, undulating, 3/8" relief 232.9-233.0' - Fracture zone			
235 -192.4			>10	236.0-237.2' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-9/16" diameter			
	R7-HQ 5 ft 64%		>5	237.2' - Fracture, 30 deg, smooth, stepped, low relief			
			>10	238.0' - Mechanical break, 30 deg, rough, undulating, tight, hardness test			
				238.85-239.2' - Fracture zone			
240							



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 3 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-197.4			NR				R7: 3 minutes
241.0			>10				
	R8-HQ 5 ft 24%	0	NR	241.0-242.2' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" diameter		Limestone 241.0-242.2' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/32" cover 5% of rock surface, trace organics No Recovery 242.2-246.0'	Driller's Remark: Rapid, consistent drilling; potential cavity or silt infill washed out during drilling
245 -202.4							
246.0			>10				R8: 2 minutes
	R9-HQ 5 ft 20%	0	NR	246.0-247.0' - Fracture zone, multiple intersecting fractures with rock fragments up to 2" diameter		Limestone 246.0-247.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/32" cover 1-2% of surface, poorly fossiliferous No Recovery 247.0-251.0'	Driller's Remark: Potential cavity at 246.0-250.0' or silt zone washed out-- consistent 50% circulation
250 -207.4							
251.0			>10				9/6/07: Complete drilling at 17:00, water level at surface 9/7/07: Re-spool 650.0' wireline, transmission down time for repair, start drilling at 12:15
	R10-HQ 5 ft 50%	18	NR	251.2' - Mechanical break or fracture, rough, undulating, angular rock fragment potentially fallen from above onto top of run, no discernible rock contact/fracture angle 251.85-252.05' - Fracture zone, rough, undulating, multiple intersecting fractures 252.5' - Fracture or mechanical break, 60-70 deg, rough, undulating, variable 252.6-253.5' - Fracture zone, rough, undulating, interbedding with silt seams		Limestone 251.0-251.2' - yellowish gray, (5Y 7/2), very fine to medium grained, strong (R4), no voids, cavities or fossil, light organic stain on <30% of surface 251.2-252.6' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 20-30% of surface, poorly fossiliferous, trace laminated bedding 252.6-253.5' - yellowish gray, (5Y 7/2), extremely weak (R0), silt lenses interbedded No Recovery 253.5-256.0'	Driller's Remark: at 253.0-254.0' light chatter; core blockage at 254.25'
255 -212.4							R10: 5 minutes
256.0			>10				
	R11-HQ 5 ft 75%	15	>10	256.0-257.5' - Fracture zone, rough, undulating, intersecting fractures and gravel sized fragments 3" diameter		Limestone 256.0-259.75' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over <10% of surface, poorly fossiliferous, trace organic staining/laminar from 256.0 to 257.0'; laminated bedding predominant from 258.8 to 259.75'	Driller's Remark: at 257.0-259.0' light to moderate chatter, consistent drilling rate
260			>10				
				258.3-258.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter 258.5' - Mechanical break or fracture, 50 deg, rough, undulating			



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-217.4			NR		No Recovery 259.75-261.0'	R11: 4 minutes	
261.0					No Recovery 261.0-266.0'		
	R12-HQ 5 ft 0%	0	NR			Driller's Remark: Rapid advancement 262.0-265.0' below ground surface, possible voids or silt lens; continuous circulation (approximately 50% return) through run; minimum of pump pressure increasing intermittently through run indicating core/fluid blockage due to formation back pressure on equipment, likely silt/soil zone washed out to formation	
265 -222.4					No Recovery 266.0-271.0'	R12: 5 minutes	
	R13-HQ 5 ft 0%	0	NR			Driller's Remark: Rapid advancement 266.0-271.0' below ground surface, as above, no recovery due to unconsolidated silt/soil concentration; pressure on flow increasing during drilling indicating back pressure from formation; HQ core barrel set on formation at 271.0' below ground surface with no free rod drop: material is present but not retrievable due to unconsolidated nature	
270 -227.4			>10		Limestone 271.1-271.25' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate HCl reaction, very weak (R1), 5% small voids up to 1/16"	R13: 4 minutes	
	R14-HQ 3 ft 8%	0	NR		No Recovery 271.25-274.0'	K. Watkins and Robert logging	
					No Recovery 274.0-279.0'	Coring Equipment: BL 300T	
274.0						R14: No Time Recorded	
275 -232.4							
	R15-HQ 5 ft 0%	0	NR			Driller's Remark: Slow drilling; used 300 gallons of muck with no recovery, decision to trip out rod and barrel to check bit, bit inspected and appears intact, hole tagged at 279.0', tripped back in to try another run	
						R15: 20 minutes	
279.0							
280	R16-HQ		4				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-237.4	2 ft 95%	21	>10	279.4, 279.6, 279.85, 279.9, 280.3, 280.4, 280.5, 280.65, 280.75' - Fractures, horizontal, smooth, planar to undulating, horizontal, clayey white infilling, open (1/5" pore)	Limestone 279.0-279.85' - yellowish gray, (5Y 7/2), medium grained, moderate HCl reaction, very weak (R1), <1% voids on surface, <1/32"	Driller's Remark: More pieces of bit recovered R16: 6 minutes	
281.0	R17-HQ 2 ft 80%	0	NR	280.0-280.15' - clay infilling			
			8	281.4, 281.5, 281.6' - Fractures (3), horizontal, rough, planar to undulating, 9/16" relief	279.85-280.0' - Same as 279.0-279.85' except yellowish gray, (5Y 8/1), with clayey striation	R17: 6 minutes Driller's Remark: Slow drilling	
			>2	281.6-281.75' - soft infill, clayey			
			NR	281.9, 281.95, 282.0, 282.1, 282.3, 282.5, 282.6' - Fractures (7), horizontal, rough, stepped	280.0-280.3' - clay - white, soft, moderate HCl reaction		
			2	283.0-238.5' - Fracture zone, broken/crushed			
			1	283.9' - Fracture, 85 deg, rough, stepped, 9/16" relief	280.3-280.9' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl reaction, medium hard, 25% surface area voids 3/16"		
285 -242.4	R18-HQ 6 ft 100%	50	2	284.4, 285.0' - Fractures (2), horizontal, rough, 11-4/5" relief, infill, limestone			
			1	285.1-285.4' - Fracture zone	No Recovery 280.9-281.0' Limestone		
			1	285.5-287.3' - Fracture zone, infill of loose medium-grained limestone			
			0	288.5' - Mechanical break, horizontal, rough, stepped, 9/16" relief, across large 1" void	281.0-282.6' - light gray, (N7), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), abundantly fossiliferous, voids to 3/16" (molds)	SC-4 Collected at 287.3-288.5' R18: 16 minutes	
			1	289.25, 289.5, 289.85' - Fractures (3), horizontal, rough, stepped, medium limestone, 9/16" relief			
290 -247.4	R19-HQ 5 ft 94%	57	3	290.9, 291.4, 291.85, 292.25, 292.8, 293.0, 294.5, 294.7' - Fractures (8), horizontal, rough, stepped, infill, loose, broken	283.0-283.5' - light gray to pale yellow brown, (N7 to 10YR 6/2), mild HCl reaction		
			3	294.0-295.2' - Bedding plane, smooth, undulating, slight (mt) metal oxide staining, parting on bedding planes			
			NR	295.8, 298.7' - Fractures (2), horizontal, rough, 9/16-1" relief	283.5-285.0' - light gray, (N7), fine to medium grained, abundant fossils, voids to 9/16" over 100% (molds)	R19: 13 minutes	
			2	299.0-304.0, 304.0-309.0' - Mechanical break (2)			
			3		285.0-287.3' - loose fragments as in 283.0 to 283.5'		
			NR				
295 -252.4	R20-HQ 5 ft 98%	55	>10		287.3-288.4' - light gray to very light gray, (N7 to N8), medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), irregularly spaced voids to 9/16"; highly fossiliferous		
			1				
			2		289.0-293.7' - very light gray to very light bluish gray, (N8 to 5B 8/1), very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), some portions clayey, <5% voids (molds)	R20: 11 minutes	
			NR				
			>10		No Recovery 293.7-294.0' Limestone		
			NR				
299.0			NR		294.0-295.5' - yellowish gray, (5Y 8/1), fine grained, weak (R2), poorly to moderately fossiliferous, <5% voids (molds) to 1/16" near 294.0'		
			>10				
300			>10		295.5-298.9' - very light gray to very light bluish gray, (N8 to 5B 8/1), mild to moderate HCl reaction, very weak to weak (R1 to R2), poorly to abundantly fossiliferous, voids to 3/4" (molds)		
			NR				
			>10		No Recovery 298.9-299.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 6 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-257.4	R21-HQ 5 ft 62%	0	>10		Limestone 299.0-301.0' - very light gray to very light bluish gray, (N8 to 5B 8/1), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), fossil molds, voids to 3/4" (less than 5%)	R21: 16 minutes	
304.0			NR		Clayey Limestone 301.0-302.1' - light yellowish gray to light bluish gray, (5Y 7/2 to 5B 8/1), very fine grained, moderate HCl reaction, with layers of very weak (R1) dark olive silty clay		
305 -262.4	R22-HQ 5 ft 90%	28	>10		No Recovery 302.1-304.0' Clayey Limestone 304.0-308.5' - light yellowish gray with bluish gray mottling, (5Y 7/2 with 5B 8/1), very fine grained, moderate HCl reaction, extremely weak (R0), very poorly unconsolidated, bioturbation filled with bluish gray infill; <5% voids	R22: 15 minutes	
309.0			NR		No Recovery 308.5-309.0'		
310 -267.4	R23-HQ 5 ft 90%	43	>10		Limestone 309.0-310.0' - very light bluish gray with medium bluish gray mottling, (5B 8/1 with 5B 5/1), very fine grained, very weak (R1)	R23: 15 minutes	
			>10		310.0-312.2' - Fractures (2), <5 deg, smooth, planar to undulating, tight		
			>10		312.6-312.8' - Mechanical break		
314.0			NR		No Recovery 313.5-314.0'		
315 -272.4	R24-HQ 5 ft 92%	17	>10		314.0-318.6' - Same as 310.0-314.0'	R24: 15 minutes	
			>10				
			>10				
319.0			NR		No Recovery 318.6-319.0'		
320			>10		319.0-319.9, 320.8-322.9, 323.4-323.8' - Mechanical break (3)		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-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% No Recovery 323.4-324.0'	R25: 15 minutes	
324.0		NR	320.5-320.8, 322.9-323.4' - Mechanical break or fracture zone (2), smooth, undulating				
325			324.4-324.7' - Mechanical break, multiple breaks				
-282.4	R26-HQ 5 ft 95%	32	3	329.0-330.0' - Fracture zone, loose			
329.0			NR	330.0-330.4' - Mechanical break, fracture/breakage zone across friable rocks	Limestone 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 No Recovery 328.8-329.0'	R26: 15 minutes	
330			NR	330.4-331.5' - Mechanical break			
-287.4	R27-HQ 5 ft 74%	15	1	331.95' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open			
334.0			NR	332.0-332.7' - Same as 330.0-332.0' except very weak (R1)			
335			3	332.7-334.0' - Mechanical break, 40 deg, rough, undulating, 3/8" relief (mechanical)	Clayey Limestone 330.2-332.0' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, extremely weak (R0), loose No Recovery 332.7-334.0'	R27: No Time Recorded	
-292.4	R28-HQ 5 ft 100%	62	1	334.6' - Mechanical break, horizontal, rough, planar, 1/16" relief			
339.0			3	334.75' - Fracture, horizontal, rough, planar, 1/16" relief			
340			>10	335.1' - Fracture, horizontal, rough, 9/16" relief			
			3	335.8, 336.7, 337.2' - Fractures (3), 30 deg, rough, undulating, 15 deg, and horizontal, 9/16" relief	Limestone 334.0-337.6' - yellowish gray, (5Y 7/2), medium grained, moderate HCl reaction, very weak to weak (R1 to R2), abundantly fossiliferous, <5% voids (molds) at 334.0-336.8', voids to 3/8" 337.6' - Fracture, horizontal, rough, planar, loose infill 337.8-339.2' - abundant breaks in very loose limestone	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	
			>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitley, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-297.4	R29-HQ 5 ft 96%	0	>10	>10	>10		Limestone 339.0-343.8' - yellowish gray, (5Y 7/2), medium grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids 1/32-1/16" throughout; friable	R29: 15 minutes
344.0			NR				No Recovery 343.8-344.0' Limestone 344.0-348.8' - light bluish gray with medium bluish gray mottling, (5B 7/1 with 5B 5/1), very fine grained, strong HCl reaction, very weak (R1), clayey, voids (bioturbation); otherwise <1% voids	
345 -302.4	R30-HQ 5 ft 96%	75	1	>10	1			
					1			
					1			
					1			
349.0			NR				No Recovery 348.8-349.0 Limestone 349.0-353.5' - bluish white with light bluish gray mottling, (5B 9/1 with 5B 7/1), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), friable, <1% visible voids	SC-6 Collected at 347.0-347.9' R30: 10 minutes
350 -307.4	R31-HQ 5 ft 96%	42	1	>10	5			
					1			
					1			
					1			
354.0			NR				No Recovery 353.5-354.0 Limestone 353.5-355.5' - yellowish gray, (5Y 8/1), medium grained, moderate to strong HCl reaction, weak (R2), abundantly fossiliferous, primarily foraminiferous <1/32" molded voids (forams) throughout; brown organic silt partings	R31: 8 minutes
355 -312.4	R32-HQ 5 ft 100%	48	1	>10	3			
					2			
					1			
					2			
359.0							Limestone 355.7-356.5' - yellowish gray, (5Y 8/1), medium grained, moderate to strong HCl reaction, weak (R2), abundantly fossiliferous, primarily foraminiferous <1/32" molded voids (forams) throughout; brown organic silt partings 356.5-359.0' - Same as 349.0-355.7' except bluish white to yellowish gray, (5B 9/1 to 5Y 8/1), scarce bioturbation	R32: 10 minutes
360								



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 9 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-317.4	R33-HQ 5 ft 100%	50	>10	359.9, 360.2, 360.45, 360.6, 362.15, 362.35, 362.55, 362.65, 363.45' - Bedding plane (9), horizontal, smooth, undulating, tight to 1/4" open	Limestone 359.0-365.5' - yellowish gray, (5Y 7/2), medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), moderately to abundantly fossiliferous, forams, pelecypods, bryozoa; <1/32" voids and foraminiferous molds ~ 50% bioturbated and finer grained, 359.0 to 360.2' and 363.0 to 365.5'	R33: 12 minutes	
364.0		>10	360.6-360.95, 361.25-362.15, 362.55-362.65' - Fracture zone (3), fragments 3" diameter				
365		2	363.75' - Fracture, vertical, smooth, undulating, 6" long, tight				
-322.4	R34-HQ 5 ft 100%	60	2	364.6, 365.6, 364.9, 366.0' - Bedding plane (4), horizontal, smooth, undulating, tight to 1/4" open	Limestone 365.5-366.8' - yellowish gray, (5Y 8/1), fine grained, mild to moderate HCl reaction, weak (R2), friable, silty, voids over <5% 366.8-367.7' - pale yellow gray to very light gray, (5Y 7/2 to N8), weak to medium strong (R2 to R3), >50% bioturbated with voids over 60% of sample, abundantly fossiliferous 367.7-369.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to moderate HCl reaction, abundantly fossiliferous (pelecypods, forams) voids, molds up to 1/16" >50% bioturbated 369.0-370.3' - yellowish gray, (5Y 7/2), fine to medium fine grained, mild HCl reaction, very weak to weak (R1 to R2), <1/32" voids (primarily foraminifera molds), friable, silty 370.3-373.7' - very light gray, (N8), with <5% light bluish gray mottling, moderate to strong HCl reaction, abundantly fossiliferous (primarily foraminifera), molds <1/32-3/16", >50% bioturbated No Recovery 373.7-374.0' Limestone 374.0-374.9' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16"; friable and very weak rock (R1) rock at 374.0-374.3' 374.9-376.8' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2), friable, as at 374-374.3' above, but with occasional olive gray organic streaks No Recovery 376.8-378.0'	SC-7 Collected at 366.8-367.7' R34: 12 minutes	
369.0		1	365.0' - Fracture or mechanical break, 20 deg, rough, undulating, open, fragment missing				
370		1	365.4' - Fracture or mechanical break, 30 deg, rough, undulating to stepped, missing fragments, tight to 1" open				
-327.4	R35-HQ 5 ft 88%	35	2	366.5-366.8' - Fracture zone, fragments to 1-2"			
374.0		NR	4	368.05-368.6' - Fracture zone, fragments to 2-3" rock weakened by fossiliferous zone			
375		2	3	369.2' - Bedding plane, horizontal, moderately smooth, planar, 1/16-3/16" open (typ)	R35: 12 minutes		
-332.4	R36-HQ 4 ft 70%	10	3	369.4, 369.6, 369.8, 370.1, 370.3' - Bedding plane (5), horizontal, moderately smooth, planar, 1/16-3/16" open (typ)			
378.0		>10	3	370.3-370.7' - Fracture zone, lithology change			
		NR	1	371.1' - Fracture, rough, undulating, 9/16" relief, break across void	R36: 15 minutes		
		>10	1	371.5, 371.8, 371.9, 373.0' - Bedding plane (4), 0-10 deg, rough, undulating, 3/16-3/4" open			
380		1	2	374.3, 374.6, 375.1' - Fractures (3), horizontal, rough, undulating, 3/16-9/16" open			
		NR	>10	375.5-376.8' - fragments, silty limestone			
		1	2	378.6, 379.3' - Fractures (2), horizontal, rough, undulating, poorly fit 3/16-9/16" open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 10 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-337.4	R37-HQ 6 ft 78%	39	3	379.6, 380.0, 380.1, 380.2, 380.7' - Bedding plane (5), horizontal, tightly fill 1/16-3/16" relief		Limestone 378.0-379.5' - very light gray, (N8), very fine grained, moderate HCl reaction, weak (R2), >50% voids <1/32" wide and bioturbated 379.5-382.6' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), friable, silty, voids <1/32", well distributed but <5% 382.6-382.9' - pale yellowish gray, (5Y 8/1), strong HCl reaction, weak to medium strong (R2 to R3), bioturbated, voids 1/8" wide No Recovery 382.9-384.0' Limestone 384.0-385.7' - Same as 379.5-382.6' except 3/8" single very extensive void across sample 385.2-385.7' 385.7-388.5' - Same as 384.0-385.7' 388.5-390.0' - light gray, (N7), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), hard, abundant voids <1/32-1/8" throughout, primarily foraminiferous Clay (CL) 390.0-390.3' - soft, calcareous with dark brown orange silt Limestone 390.3-394.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, very weak to weak (R1 to R2), friable, organic staining within many fractures <1/32-3/16" voids 394.0-399.0' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/32-3/16" (molds and casts) 394.0-395.0' bioturbated No Recovery 398.5-399.0'	R37: 16 minutes	
			>10	380.9-382.7' - Fracture zone				
			>10					
			NR					
384.0			>10	384.0-384.3' - Fracture zone, fragments to 4"x2"				
385			>10	384.3, 384.5, 384.8, 385.3, 387.85' - Bedding plane (5), 0-5 deg, smooth, undulating, tight to 1/2" open				
-342.4	R38-HQ 5 ft 100%	55	1	385.5' - Fracture, rough, undulating, 4-3/16" void				
			2	385.65' - Mechanical break, <5 deg, rough, undulating, tight				
			>10	387.5' - Mechanical break, 20 deg, rough, undulating, tight				
389.0			>10	388.4-388.8' - Fracture zone, fragments to 2"x2"				
390			2	389.4' - Fracture, 80 deg, rough, undulating, open, missing face				
-347.4	R39-HQ 5 ft 100%	0	0	389.6' - Mechanical break, <5 deg, rough, undulating, tight				
			>10	389.8' - Bedding plane, horizontal, smooth, planar to undulating				
			>10	389.9-394.0' - Fracture zone, some brown organic staining on fractures, various fragments of all orientation within limestone; mechanical				
			>10					
394.0			>10					
395			3	394.2, 394.3, 394.5, 394.9' - Mechanical break or bedding plane (4), horizontal and 10 deg, rough, undulating, organic staining at 394.5'; 3/16 to 3/8" relief				
-352.4	R40-HQ 5 ft 90%	53	2	395.3-395.8' - Fracture zone, 3/4 to 1-1/2" blocky fragments				
			2	396.4, 396.9' - Mechanical break (2), horizontal, rough, undulating, 1-3/16" relief				
			0					
			0					
			NR					
399.0			NR					
400			3	399.3, 399.7, 400.1' - Bedding plane (3), horizontal, smooth				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 11 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-357.4	R41-HQ 5 ft 96%	53	2	400.1-400.3' - Fracture zone	Limestone 399.0-404.0' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), mold and casts over 20% of rock, foraminifera, gastropods, pelycypods, bioturbated 400.0-401.0'	R41: 9 minutes Finished at 15:15 on 9/20/07 Started at 07:30 on 9/21/07	
2			401.1' - Fracture, 30 deg, rough, 3/16-9/16" relief, mechanical				
2			401.7, 402.1, 402.4, 402.6, 403.2' - Fractures (5), 0-20 deg, planar, tight				
404.0			NR		No Recovery 403.8-404.0'		
405	R42-HQ 5 ft 99%	40	5	404.1, 404.3, 404.5, 404.6, 404.8, 405.3, 405.7' - Mechanical break (7), horizontal and 30 deg, rough, planar to undulating, poorly fit, >9/16" open	Limestone 404.0-409.0' - Same as 399.0-404.0' except molds and casts 1/16-3/16" between 405.0-407.0'	R42: 11 minutes	
-362.4			3	406.0, 406.5, 406.8' - Mechanical break (3), 0-20 deg, rough, undulating, tightly fit to 3/8" open			
409.0			1	407.5, 408.2' - Mechanical break (2), 30 deg, very rough, planar, tightly fit			
410	R43-HQ 5 ft 80%	27	3	408.5-408.8' - Mechanical break, vertical	No Recovery 408.95-409.0' 409.0-411.3' - light yellowish gray, (5Y 9/1), fine grained, moderate HCl reaction, very weak (R1), voids to 1/4", fine black needle form mineral throughout 5% (possibly phosphate or organic)	R43: 14 minutes	
-367.4			NR	408.9' - Mechanical break, horizontal, planar to undulating			
414.0			2	409.1, 409.2' - Mechanical break (2), horizontal, smooth, undulating, poorly fit			
415	R44-HQ 5 ft 96%	50	0	410.3' - Mechanical break, horizontal, very rough, stepped, tightly fit, 3/4" relief	Clay (CL) 411.3-411.7' - light gray calcareous silty clay Limestone 411.7-413.0' - Same as 409.0-411.3' except medium strong (R3) No Recovery 413.0-414.0' Limestone 414.0-416.5' - yellowish gray, (5Y 8/1), moderate HCl reaction, medium strong (R3), finely crystalline; 415.0-416.5' medium strong (R3); 414.0-415.0' very weak; 414.7-414.9' very weak (R1), dark brown organics	R44: 13 minutes	
-372.4			3	410.7' - Fracture, 30 deg, smooth, planar, 1/16" open			
419.0			NR	411.1, 411.3' - Mechanical break (2), horizontal, very poorly fill, 1-3/16" open			
420			2	411.6-411.9' - Fracture zone, through consolidated limestone	Clayey Silt (ML) 418.7-418.8' - greenish black		
			NR	412.2' - Mechanical break, 30 deg, break through unconsolidated limestone			
			5	412.7, 412.8' - Mechanical break (2), horizontal			
			1	414.25, 414.4' - Mechanical break (2), planar to undulating, poorly fit			
			1	414.6' - Fracture, horizontal, undulating, poorly fit with (Mt) oxide staining evident			
			1	415.0' - Fracture, 40 deg, discontinuity between hard fossiliferous limestone and dark organic silt clay			
			3	415.7, 416.5, 417.2, 417.7, 418.0, 418.3' - Mechanical break (6), horizontal, planar			
			2	418.7' - Fracture, horizontal, rough, planar, contact: hard fossiliferous limestone over dark brown silty clay. mt oxide staining on limestone surface			
			NR				
			0				
			2				



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 12 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-377.4	R45-HQ 5 ft 100%	61	0		No Recovery 418.8-419.0' Clayey Silt (ML) 419.0-419.2' - greenish black, organic	R45: No Time Recorded	
			3		Limestone 419.2-421.5' - yellowish gray, (5Y 8/1), weak (R2), >5% casts and molds (foraminiferons, tortella, pelycypods), voids of various size throughout		
			4		421.5' - Bedding plane, horizontal, undulating, horizontal undulating break along bedding, <1/16" infill (organic)		
			1		421.8-422.3' - Mechanical break, vertical 422.8' - Bedding plane, smooth, undulating, break along bedding, tight fit, organic staining		
424.0			1		421.5-423.0' - pale yellowish brown, (10YR 6/2), very fine grained, strong HCl reaction, weak (R2)	Bit drops at 424.5'	
425			NA		423.0-424.5' - pale yellowish brown, (10YR 6/2), very dense, mild to moderate HCl reaction, very strong (R5), crystalline, <1/32" voids throughout		
-382.4	R46-HQ 5 ft 58%	12	>10		Clay (CL) 424.5-425.2' - brownish gray, soft, carbonate		
429.0			NR		Limestone 425.2-427.0' - light olive gray, (5Y 6/1), strong HCl reaction, very weak to weak (R1 to R2), limestone fragments	Various bit drops between 427-429' (void depths unknown) R46: 15 minutes	
430			4		No Recovery 427.0-429.0' Limestone 429.0-433.0' - light yellowish gray, (5Y 9/1), dense, strong HCl reaction, medium strong (R3), microcrystalline, no visible voids, medium strong (can be carved with a knife) organic, silty bedding planes, last 4" very soft and clayey		
-387.4	R47-HQ 5 ft 78%	27	1		No Recovery 433.0-434.0'	R47: 15 minutes	
			3				
434.0			NR			SC-8S Collected at 434.0-435.4' (soft soil sample)	
435			NA		Clayey Silt/ Silt (ML) 434.0-435.4' - greenish black, (5GY 2/1), organic soft		
-392.4	R48-HQ 4 ft 100%	0	0		Peat/organics 435.4-435.9' - greenish black, (5GY 2/1), moderate HCl reaction, extremely weak to very weak (R0 to R1), >50% organic material		
			>10		Limestone 435.9-438.0' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2)	R48: 16 minutes	
438.0			>10			SC-9 Collected at 438.5-439.4'	
			1		438.5' - Mechanical break, horizontal, rough, undulating, 3/16" open		
440			>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-397.4	R49-HQ 6 ft 43%	14	>10		438.0-439.4' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, medium strong (R3), abundant voids to 1/8" with some voids filled with organic silt, <5% fossils, primarily molds	R49: 18 minutes	
444.0			NR		439.4-440.6' - dusky yellow, (5Y 6/4), strong HCl reaction, very weak (R1), friable silt No Recovery 440.6-444.0'		
445			2		Limestone 444.0-446.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, mild HCl reaction, very weak to weak (R1 to R2), dolomite, crystalline friables, >5% voids up to 1/16"	Driller's Remark: Bit drop 2.0 ft into run, interpreted as void	
-402.4	R50-HQ 5 ft 56%	20	1		445.0' - Fracture, possible void 445.6' - Mechanical break, notched medium fit 1/16" open 446.0' - Fracture, bit dropped, assumed void location		
			NR		446.0-447.8' - missing	R50: 9 minutes	
449.0			1		447.8-448.6' - dusky yellowish brown to pale yellow brown, (10YR 2/2 to 10YR 4/2), fine grained, strong HCl reaction, crystalline, calcite, large voids to 1-1/4" with calcite rhombic crystals and clean hexagonal quartz crystals other voids filled with silty friable dolomite		
450			NR		No Recovery 448.6-449.0' No Recovery 449.0-451.0' Limestone	Driller's Remark: Void at top of run, 1.0' of drilling in middle of void near bottom, (based on bit drop)	
-407.4	R51-HQ 5 ft 32%	0	>10		451.0-452.0' - Fracture zone, limestone (dolomite) 452.0' - Fracture, void		
			NR		No Recovery 452.0-454.0'	R51: No Time Recorded	
454.0			>10		Limestone 454.0-455.9' - pale yellowish brown, (10YR 6/2), fine grained, <5% voids to 3/16", poorly fossiliferous		
455			>10		455.9-457.0' - light olive gray to pale olive, (5Y 5/2 to 10Y 6/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), friable, silty	R52: No Time Recorded	
-412.4	R52-HQ 5 ft 76%	7	4		457.0-457.8' - Same as 454.0-455.9' except first 3" are amber brown, dolomite No Recovery 457.8-459.0'		
			NR			Finished drilling on 9/21/07 at 459.0'	
459.0			>10		459.0-459.5' - Fracture zone, 1"-3" rock fragments of hard dolomite		
460			>10			Start drilling on 9/22/07	



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 14 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-417.4	R53-HQ 5 ft 100%	25	3	460.0, 462.7' - Fracture (2), 75 deg, planar, fracture through hard dolomite, 3/16" relief	Limestone 459.0-460.2' - moderate brown to grayish brown, (5YR 3/4 to 5YR 3/2), dense, fine to medium grained, mild HCl reaction, medium strong to strong (R3 to R4), crystalline, dolomite; <1/32" voids over 70% of surface	R53: 13 minutes	
>10			460.4' - Fracture or mechanical break, 30 deg, rough, planar				
5			460.6, 460.8, 461.2, 461.3' - Bedding plane or mechanical break (4), horizontal, planar, 3/16" relief				
>10			461.7-462.3' - Fracture zone, horizontal, undulating, dolomite, poorly fit				
464.0	R54-HQ 5 ft 60%	0	>10	463.4-463.8' - Fracture zone	460.2-462.2' - fine to medium grained, mild HCl reaction, very weak (R1), friable breaks on bedding planes	R54: 12 minutes	
465			>10	464.0-466.3' - Fracture zone, large fragments of blocky to angular dolomite	462.2-464.0' - Same as 459.0-460.2' except moderate brown to grayish brown, (5YR 3/4 to 5YR 3/2), dolomite		
-422.4			>10	466.5' - Fracture or mechanical break, 45 deg, across hard dolomite over friable dolomite below, tightly fit	Limestone 464.0-466.5' - Same as 462.2-464.0'		
469.0			NR	466.7' - Fracture, horizontal, planar, 3/16-3/8" relief, contact between hard dolomite and friable dolomite below	466.5-467.0' - yellowish brown, (10YR 5/4), moderate HCl reaction, friable, silty, streaks of organic staining on bedding No Recovery 467.0-469.0'		
470	R55-HQ 5 ft 60%	13	>10	469.0-470.2, 471.0-471.4' - Fracture zone (2), hard, dolomite	Limestone 469.0-472.0' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2), finely crystalline, dolomite, voids throughout variable 1/16-3/4"	R55: 12 minutes	
-427.4			1	470.6' - Fracture, horizontal, rough, planar, break tensely fit, 9/16" relief			
474.0			>10	471.8-472.0' - Fracture zone			No Recovery 472.0-474.0'
475			NR	474.0-475.1' - Fracture zone			
-432.4	R56-HQ 5 ft 80%	27	>10	475.5' - Fracture or mechanical break, 50 deg, very rough, undulating, tight	Limestone 474.0-478.0' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2), extensive voids throughout 1/16-3/4", finely crystalline dolomite, few of the voids with clean hexagonal quartz crystals (1/8")	R56: 14 minutes	
479.0			3	476.5' - Mechanical break, 45 deg, tightly fit			
480			>10	476.7' - Mechanical break, 10 deg, planar, tight			
			NR	477.3' - Mechanical break, horizontal, undulating, tight			No Recovery 478.0-479.0'
			2	479.0-479.3' - Fracture zone, hard dolomite			
				479.3' - Fracture, 45 deg, rough, irregular break across voids			



PROJECT NUMBER: 338884.FL	BORING NUMBER: AD-04	SHEET 15 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-437.4	R57-HQ 5 ft 88%	48	2	480.0-480.3' - Fracture zone, through dolomite		Limestone 479.0-481.7' - yellowish orange, (10YR 7/4), very weak to weak (R1 to R2), finely crystalline, dolomite, voids throughout to 3/4" 481.7-483.4' - grayish orange, (10YR 7/4), dolomite with calcareous infill voids; 482.6': portion of gray infilled limestone 3" thick No Recovery 483.4-484.0'	SC-10 Collected at 481.7-483.3' R57: 14 minutes	
6			480.8' - Fracture, horizontal, rough, undulating, horizontal break through voids					
0			481.0-481.4' - Fracture zone, through friable dolomite					
0			481.4-481.7' - Fracture, 60 deg, through hard dolomite					
NR			481.7' - Fracture, horizontal, very rough, undulating, Mt oxide staining					
484.0	R58-HQ 5 ft 90%	38	4	484.2-484.5' - Mechanical break, 45 deg and horizontal, undulating, poorly fit		Limestone 484.0-487.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), finely crystalline dolomite, voids to <1/16-3/16"; many filled with amber calcite 487.0-488.5' - dusky yellow, (5Y 6/4), very weak (R1), very friable, finely crystalline dolomite No Recovery 488.5-489.0'	R58: 12 minutes	
1			485.7' - Mechanical break, horizontal, undulating, across void, tightly fit					
2			486.4' - Fracture zone, irregular					
>10			487.0, 487.3' - Mechanical break (2), horizontal, planar, very poorly fit across friable dolomite					
>10			487.3-488.5' - Fracture zone, friable to unconsolidated dolomite					
NR								
485 -442.4	R59-HQ 5 ft 92%	50	>10	489.0-489.8' - Fracture zone, large angular block, limestone fragments		Limestone 489.0-489.3' - yellowish gray, (5Y 8/1), very fine grained, very strong HCl reaction, weak to medium strong (R2 to R3), <1/32" void over 10%, 1" thick layer of soft calcareous clay 489.3-493.6' - pale grayish orange to dusky yellow, (10YR 7/4 to 5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), >8% voids throughout <1/32-1/16", many voids with amber calcite fill, finely crystalline No Recovery 493.6-494.0'	R59: 14 minutes	
6			490.0-490.1' - Fracture, horizontal, smooth, undulating, discontinuity with 1" white clay infill					
2			490.1, 490.3' - Mechanical break (2), horizontal, planar, poorly fit					
2			490.6' - Mechanical break, 15 deg, rough, planar, tightly fit					
0			490.8-491.0' - Mechanical break, 85 deg, fracture between 2 horizontal bedding plane breaks					
NR			491.7' - Mechanical break, undulating, 1/16-3/16" open					
4			492.4-492.5' - Mechanical break (2), planar, 3/16-5/16" open					
495 -452.4	R60-HQ 6 ft 95%	47	3	494.4, 494.7, 494.9, 495.0' - Mechanical break (4), 0-15 deg, rough, poorly fit		494.0-499.7' - grayish orange, (10YR 7/4), moderate HCl reaction, medium strong (R3), dolomite, weak to medium strong (R1-R2) through areas of bedding plane discontinuities; voids <1/32-1/8", uniformly distributed, some voids filled with amber calcite, numerous open voids to 1.5" with amber, calcite crystal growth, finely crystalline 496.0-496.9' - moderate yellowish brown to grayish brown, (10YR 5/4 to 10YR 7/4), mild HCl reaction, finely crystalline dolomite, well-distributed 1/32-1/16" voids, some filled with crystals, black organics, white calcareous clay SC-11 Collected at 496.0-496.9' R60: 14 minutes		
>10			495.8' - Fractures (2), horizontal, light brown clay infill (1"), poorly fit					
2			495.9' - Fracture (2), horizontal, light brown clay infill (1"), poorly fit					
4			497.7-498.3' - Mechanical break or bedding plane (4), horizontal, planar, through friable dolomite					
3			498.8, 498.9, 499.0, 499.3, 499.5, 499.6' - Bedding plane (6), horizontal, poorly fit, friable dolomite					
NR								
500	500.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5.88 ft bgs on 9/13/07 START : 9/6/2007 END : 9/27/2007 LOGGER : R. Bitely, J. Townes, S. Roberti, K. Waikins

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
						No Recovery 499.7-500.0' Bottom of Boring at 500.0 ft bgs on 9/27/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-01	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
40.8	0.0	0.9	SS-1	1-3-5 (8)	Topsoil 0.0-0.3' - brownish black, (5YR 2/1), moist, 15% roots 85% organic fines Poorly Graded Sand (SP) 0.3-0.85' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), moist, loose, very fine to fine grained, trace roots, trace nonplastic fines, silica sand		Additional equipment note: 3-7/8" tricone bit, split spoon Start drilling 5/23/07 at 08:15; water level = 1' ft below ground surface
	1.5						
5	5.0						
35.8	6.5	1.1	SS-2	1-4-6 (10)	Poorly Graded Sand With Silt (SP-SM) 5.0-6.1' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moist to wet, loose, very fine to fine grained, no HCl reaction, 12% nonplastic fines, trace roots, silica sand		
10	10.0						
30.8	11.5	1.1	SS-3	4-9-10 (19)	Poorly Graded Sand (SP) 10.0-11.1' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moist to wet, medium dense to dense, fine to medium grained, no HCl reaction, trace black minerals, silica sand		
15	15.0						
25.8	16.5	0.8	SS-4	6-9-9 (18)	Poorly Graded Sand With Silt (SP-SM) 15.0-15.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, medium dense, no HCl reaction, 5% nonplastic fines, silica sand		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-01	SHEET 2 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
20.8	20.0	1.5	SS-5	2-2-2 (4)	Silty Sand (SM) 20.0-21.5' - pale yellowish brown, (10YR 6/2), wet, very loose, no HCl reaction, 35% nonplastic fines, silica sand		
	21.5						
25	25.0	1.5	SS-6	1-1-1 (2)	Silty Sand (SM) 25.0-26.5' - Same as above except 35-40% nonplastic fines		
15.8	26.5						
30	30.0	1.5	SS-7	0-1-1 (2)	Silty Sand (SM) 30.0-31.5' - Same as above except 35-40% non to low plastic fines		
10.8	31.5						
35	35.0	0.5	SS-8	1-2-4 (6)	Silt (ML) 35.0-35.5' - pale yellowish brown, (10YR 6/2), moist to wet, low plasticity, rapid dilatancy, mild to moderate HCl reaction, very thinly bedded, 5-10% fine to medium grained silica sand, lens of coarse sand-sized material from 35.4-35.5', all carbonate materials, trace organics throughout, one 1/4" thick organic lense		
5.8	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-01	SHEET 3 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
0.8	40.0	1.5	SS-9	2-2-2 (4)	Clayey Sand With Organics (SC) 40.0-41.5' - olive gray, (5Y 4/1), moist to wet, very loose, very fine to fine grained, no HCl reaction, organic lenses, 16% medium plastic fines, fines appear to be organic, silica sand		
	41.5						
45	45.0						
-4.2	45.4	0.4	SS-10	50/5 (50/5")	Organic Soil (OL) 45.0-45.2' - greenish black, (5GY 2/1), moist to wet, hard, very fine to fine grained, medium plasticity, slow dilatancy, no HCl reaction, 5-10% silica sand Clayey Sand (SC) 45.2-45.4' - light olive gray, (5Y 6/1), moist to wet, 35% medium to plastic fines, silica sand		HW casing down to 45.0'
50	50.0						
-9.2	50.9	0.9	SS-11	27-50/5 (77/11")	Silty Sand (SM) 50.0-50.85' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), moist to wet, very dense, very fine to medium grained, strong HCl reaction, 45-50% nonplastic fines, all carbonate material		
55	55.0						
-14.2	55.3	0.3	SS-12	50/4 (50/4")	Sandy Silt (ML) 55.0-55.3' - light olive gray, (5Y 5/2), wet, nonplastic to low plasticity, rapid dilatancy, moderate to strong HCl reaction, 30% very fine to medium sand, 10% coarse sand, all carbonate materials		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-01	SHEET 4 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-19.2	60.0	1.5	SS-13	32-15-10 (25)	<p>Sandy Silt (ML) 60.0-60.8' - light olive gray, (5Y 5/2), wet, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 30-40% fine to coarse sand, all carbonate</p> <p>Silty Sand (SM) 60.8-61.5' - light olive gray, (5Y 5/2), wet, medium dense, mild to moderate HCl reaction, 40% nonplastic fines, limestone lenses up to 1/4"-1/2" thick, all carbonate</p>	There is no distinct boundary between the subunits; boundary is gradational
61.5						
65	65.0	0.0	SS-14	50/0.25 (50/0.25")	<p>Limestone Fragments 65.0-65.1' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, fine gravel-size fragments</p>	Driller's Remark: Hit rock at 65.0'
-24.2						
70	70.0	0.0	SS-15	50/1 (50/1")	<p>No Recovery 70.0-70.1' Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log</p>	10:00 Began rock coring; water level at 2.3' below ground surface
-29.2	70.1					
75						
-34.2						
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-29.2	70.0						
	R1-NQ 5 ft 39%	17	>10	70.3' - Fracture, 65 deg, rough, undulating, tight, open <1/8"	Limestone 70.0-71.95' - moderate olive brown, (5Y 4/4), fine grained, moderate to strong HCl reaction, weak (R2), voids (1/16") over 25% of surface, trace fossil molds, largest 1/4"x1/2", trace secondary recrystallization in voids No Recovery 71.95-75.0'	SC-1 collected at 71.15-71.95' Driller's Remark: Soft from 72.0-74.0' R1: 3 minutes	
			1	70.35-70.6' - Fracture zone, very fine to coarse gravel sized fragments			
			NR	70.65-70.85' - Bedding plane, <10 deg, smooth, undulating, tight to 1/4" open 71.1' - Fracture or mechanical break, rough, undulating, tight			
75	75.0						
-34.2							
	R2-NQ 5 ft 64%	10	>10	75.0-75.2' - Fracture zone 75.5-75.9' - Fracture zone	Limestone 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") over 40% of surface, trace secondary recrystallization, trace fossil casts up to 1/2" diameter No Recovery 78.2-80.0'	Driller's Remark: Soft from 76.5-77.0' R2: 5 minutes	
			6	76.4, 76.55, 76.7, 76.9, 76.95' - Bedding plane (3), <10 deg, rough, undulating to stepped, open <1/2"			
			4	76.8-76.9' - Fracture zone 77.25, 77.1, 77.6, 77.9' - Bedding plane or mechanical break (4), <10 deg, rough, undulating to stepped, open <1/2"			
			NR	78.1-78.2' - Fracture zone			
80	80.0						
-39.2							
	R3-NQ 5 ft 84%	38	5	80.15, 80.3, 80.4, 80.55, 80.75, 81.05, 81.35' - Bedding plane or mechanical break (7), <10 deg, smooth, undulating, open <1/2"	Limestone 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 (fossils/molds) No Recovery 84.2-85.0'	Driller's Remark: No circulation at 80' SC-2 collected at 81.35-82.35' R3: 6 minutes	
			2	81.05' - Bedding plane or mechanical break, 30 deg, smooth, undulating, open <1/8"			
			2	82.35-82.4' - Mechanical break 82.4' - Bedding plane or mechanical break, 10 deg, rough, undulating, tight			
			>10	82.4-82.7' - Mechanical break 82.7-84.2' - Fracture zone			
			NR				
85	85.0						
-44.2							
	R4-NQ 5 ft 44%	18	3	85.1' - Bedding plane or mechanical break, 10 deg, rough, fine gravel with clayey silt infill, open (large)	Limestone 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) No Recovery 87.2-90.0'	Driller's Remark: 86-87' silty clay Driller's Remark: Still no circulation R4: 4 minutes	
			>10	85.35, 86.0, 86.85, 86.95' - Bedding plane or mechanical break (4), <10 deg, rough, undulating, no infill, open <1/2"			
			1	85.9' - Bedding plane or mechanical break, 50 deg, smooth, undulating, tight			
			NR	86.0-86.4' - Fracture zone, clayey silt infill 87.1' - Bedding plane or mechanical break, 50 deg, smooth, undulating, open <1/8"			
90	90.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-49.2	R5-NQ 5 ft 46%	29	>10	90.2' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open <1/2"	Limestone 90.0-90.4' - yellowish gray, (5Y 8/1), moderate HCl reaction, weak (R2), voids (<1/16") over 5% of surface, trace fossil molds/cavities Limestone 90.4-92.3' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), voids (1/16") over 40% of surface, fossil molds No Recovery 92.3-95.0'	Driller's Remark: 92.0-93.0' silty clay Driller's Remark: 94-94.5' possible voids R5: 5 minutes	
1			90.4-90.8, 91.3-91.45' - Fracture zone (2), fine to coarse gravel sized fragments				
0							
95	R6-NQ 5 ft 38%	0	>10	95.0-95.1, 95.4-95.7' - Fracture zone (2), fine to coarse gravel sized fragments	Limestone 95.0-96.5' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak (R0), voids (1/16") over 40% of surface from 95.0-96.1' and 25% of surface from 96.1-96.5', few cavities, few small (<1/4") fossils Silt (ML) 96.5-96.9' - carbonate material No Recovery 96.9-100.0'	Driller's Remark: 96.0-99.0' very soft clay R6: 3 minutes	
5			95.7-96.0' - Fracture, vertical, smooth, undulating, fragmented rock on one side of fracture				
0			96.0, 96.1, 96.4, 96.55' - Bedding plane or mechanical break (4), <10 deg, smooth, planar to undulating, open <1/2"				
100	R7-NQ 5 ft 87%	32	2	100.6, 100.7, 100.8' - Mechanical break (3), <10- 50 deg, smooth, undulating, tight	Limestone 100.0-104.35' - grayish yellow to yellowish gray, (5Y 8/4 to 5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), trace coarse grained material, voids (< 1/16") over 40% of surface, abundant cavities/fossil molds, few fossils, trace black organics material No Recovery 104.35-105.0'	R7: 5 minutes	
5			101.3, 101.4, 101.5, 101.55, 101.6' - Mechanical break (5), <10 deg, smooth, planar to undulating, tight to open <1/8"				
6			102.2-102.3' - Fracture zone, very fine to fine gravel sized fragments				
5			102.5, 102.75, 103.0, 103.1, 103.35, 103.55, 103.6, 103.85' - Mechanical break (8), <10 deg, smooth, planar to undulating, tight to open <1/8"				
1			104.1-104.35' - Fracture zone, coarse gravel				
NR							
105	R8-NQ 5 ft 51%	20	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 coarse-sized material, voids (< 1/16") over 40% of surface, abundant cavities/fossil molds, few fossils, trace black organics material 106.5-107.55' - Same as 105.0-106.5' except grayish yellow, (5Y 8/4) No Recovery 107.55-110.0'	Driller's Remark: 106.0-107.5' soft, probably sand R8: 4 minutes	
>10			106.6' - Fracture zone, fine to coarse gravel				
0							
110							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 1.0 ft bgs on 5/23/07 START : 5/23/2007 END : 5/30/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-69.2	R9-NQ 5 ft 84%	20	>10	110.5' - Mechanical break, 60 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 110.0-114.2' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), voids (<1/16") over 40% of surface, few cavities, fossil molds No Recovery 114.2-115.0'	R9: 4 minutes
7			110.7, 110.9-111.1, 111.3, 111.35, 111.55' - Bedding plane or mechanical break (5), <10 deg, smooth, planar to undulating, open <1/8"				
5			111.1-111.35' - Fracture (2), 80 deg, smooth, undulating, tight				
6			112.4, 112.45' - Mechanical break (2), <15 deg, undulating, smooth to rough, open <1/2"				
1			112.75-112.85' - Fracture zone				
115 -74.2	R10-NQ 5 ft 56%	13	NR	113.3, 113.45, 113.7, 113.8' - Bedding plane or mechanical break (4), <15 deg, undulating, smooth to rough, open <1/2", gray/black staining on rock core and fracture surface from 112.8-113.6'	[Symbolic Log]	Limestone 115.0-117.8' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), gray/black staining from 117.5-117.9' No Recovery 117.8-120.0'	R10: 3 minutes
2			113.8-114.2' - Fracture zone				
3			115.2-115.4' - Fracture zone, sand- to gravel-size fragments				
120 -79.2	R11-NQ 5 ft 97%	16	>10	115.75, 116.3, 117.0' - Bedding plane or mechanical break (3), <10 deg, rough, undulating to stepped, tight to open <1/2"	[Symbolic Log]	Limestone 120.0-124.85' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, extremely weak (R0), trace secondary recrystallization voids No Recovery 124.85-125.0'	R11: 3 minutes
>10			116.0-116.1, 117.2-117.8' - Fracture zone (2), fine to coarse gravel-sized fragments				
6			120.15' - Fracture, 30- 50 deg, rough, undulating, open <1/4"				
3			120.55' - Fractures, 10 - 50 deg, undulating, smooth to rough, open <1/2"				
125 -84.2	R12-NQ 5 ft 89%	38	>10	121.0, 121.1, 121.25, 121.4, 121.6, 121.65, 121.8, 122.05, 122.1, 122.2, 122.75, 122.8, 122.95' - Bedding plane (13), <10 deg, smooth, undulating, open <1/4"	[Symbolic Log]	Limestone 125.0-129.45' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, extremely weak (R0) No Recovery 129.45-130.0'	16:00 Stopped drilling and left core barrel in overnight due to possibility of hole caving R12: 5 minutes
6			123.2, 123.4, 123.45, 123.75, 124.2, 124.35' - Fractures (6), 10 - 50 deg, undulating, smooth to rough, <1/2" open				
NR			124.7' - Bedding plane, <10 deg, smooth, undulating, open <1/4"				
3			125.2, 125.4, 125.9' - Bedding plane (3), <10 deg, smooth, undulating, open <1/2"				
3			125.9' - Fractures, 30 deg, smooth, undulating, tight to open <1/4"				
5			126.1, 126.2, 126.3' - Bedding plane (3), <10 deg, smooth, undulating, open <1/2"				
130	130.0	NR	127.1' - Fractures, 30 deg, smooth, undulating, tight to open <1/4"	127.8, 127.9, 128.2, 128.5, 128.7, 128.85' - Bedding plane (6), <10 deg, smooth, undulating, open <1/2"	129.25' - Fractures, 30 deg, smooth, undulating, tight to open <1/4"		



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-89.2	R13-NQ 5 ft 98%	73	>10		130.2, 130.4, 130.7, 131.0, 131.1, 131.2, 131.25' - Bedding plane or mechanical break (7), <10 deg, undulating, smooth to rough, open <1/2"	Limestone 130.0-134.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, extremely weak (R0), very fine grained from 130.7-131.3'	SC-3 collected at 133.1-134.1' R13: 5 minutes	
			5		131.3' - Fractures, 15 -20 deg, smooth, undulating, open <1/2"			
			7		132.0, 132.25, 132.5, 132.6, 132.75, 132.95, 133.9' - Bedding plane or mechanical break (7), <10 deg, undulating, smooth to rough, open <1/2"			
			0					
			3		133.95' - Fractures, 15- 20 deg, smooth, undulating, open <1/2"			
135 -94.2	R14-NQ 5 ft 78%	7	NR		134.65, 134.75, 134.8' - Bedding plane or mechanical break (3), <10 deg, undulating, smooth to rough	No Recovery 134.9-135.0' Limestone 135.0-138.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, extremely weak (R0), except 135.1-135.3' and 136.7-137.1', very fine grained material with lineations (1/8" thick) of yellowish gray (5Y 8/1) and light olive gray (5Y 5/2), gray material in few voids No Recovery 138.9-140.0'	R14: 5 minutes	
			5		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, planar to undulating, open <1/4"			
			9		136.4' - Fracture or mechanical break, 15 deg, rough, undulating, tight			
			6		136.5, 136.6, 136.7, 136.75, 136.95, 137.05, 137.3, 137.55, 137.7, 137.8, 138.05, 138.2, 138.3' - Bedding plane or mechanical break (13), <10 deg, smooth, planar to undulating, open <1/4"			
			3					
140 -99.2	R15-NQ 5 ft 80%	12	>10		140.2, 140.3' - Bedding plane or mechanical break (2), <10 deg, smooth, undulating, tight to open <1/2"	Limestone 140.0-140.8' - yellowish gray, (5Y 8/1), very fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 15% of surface, few cavities of fossil molds (1/4"x1/2") 140.8-144.0' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace localized medium to coarse grained material, voids (<1/16") over 40% of surface, few cavities, abundant fossil casts No Recovery 144.0-145.0' Limestone 145.0-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 15% of surface, few cavities (1/8"x3/4"-elongated) 146.7-149.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), trace coarse grained material, voids (<1/16") over 40-50% of surface, abundant fossil casts and molds	Driller's Remark: 142-143' void Driller's Remark: 143.5-144' soft R15: 5 minutes	
			3		140.5' - Fracture, vertical, rough, undulating, open <1/4"			
			4		140.7-140.9' - Fracture zone			
			>10		141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 142.88, 143.16, 143.42, 143.55' - Bedding plane or mechanical break (10), <10 deg, rough, undulating, tight to open <1/2"			
			NR		143.65-143.85' - Fracture zone			
145 -104.2	R16-NQ 5 ft 90%	36	>10		145.05' - Bedding plane or mechanical break, 10 deg, smooth to rough, planar to undulating	No Recovery 149.5-150.0'	R16: 6 minutes	
			>10		145.5-145.6' - Fracture zone			
			3		145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, planar to undulating			
			3		146.0-146.35' - Fracture zone			
			3		146.65' - Mechanical break			
	3		146.83, 146.86' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, planar to undulating					
	2		147.3' - Bedding plane					
	NR		147.47' - Bedding plane					
150	150.0					Bottom of Boring at 150.0 ft bgs on 5/30/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-01
SHEET 9 OF 9	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION		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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
Vertical scale markings	Vertical scale markings	Vertical scale markings	Vertical scale markings	Vertical scale markings	Vertical scale markings	Vertical scale markings	
			147.65' - Bedding plane or mechanical break, <10 deg, smooth to rough, planar to undulating 148.35' - Mechanical break, smooth, undulating, open <1/8" 148.55, 148.75, 148.9, 149.0, 149.15' - Bedding plane (5), <10 deg, undulating, smooth to rough, tight			Total depth = 150.0'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-02	SHEET 1 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
		2-2-2 (4)		2-3-2 (5)			
41.8	0.0	1.0	SS-1	2-2-2 (4)	Poorly Graded Sand With Silt (SP-SM) 0.0-1.0' - mottled dark gray, yellowish gray and pale yellowish brown, (N3, 5Y 8/1 and 10YR 6/2), moist, very loose, very fine to fine grained silica sand, 5-10% nonplastic fines, 10% rootlets <1/16" up to 2-1/2" long, trace dark yellowish orange (10YR 6/6) mottling near top	|	NW-Rod (5.0' sections) QuikGel brand bentonite (50 lb bags) 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 surface due to moisture content of SS-1 and SS-2
5 36.8	1.5	0.5	SS-2	2-3-2 (5)	Clayey Sand (SC) 5.0-5.5' - moderate yellowish brown and pale green, (10Y 5/4 and 10G 6/2), mottled, moist to wet, loose, 30-35% medium plastic, fine grained silica sand, 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 31.8	5.0	1.2	SS-3	1-5-42 (47)	Silt With Sand (ML) 10.0-11.2' - grayish yellow to moderate yellow, (5Y 8/4 to 5Y 7/6), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5-10% fine to medium grained silica sand, 20% medium to coarse grained in pockets, all carbonate	|	10:17 Driller's Remark: switched to 4-3/4" tricone roller bit to straighten out the hole, will add 10' of 4" HW casing to ensure a 90° 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 drilling, hard slow drilling at 14.5', 2' adaptor and 1-3/8" tricone roller drill
15 26.8	11.5	0.1	SS-4	50/2 (50/2")	Limestone Fragments 15.0-15.1' - grayish yellow to moderate yellow, (5Y 8/4 to 5Y 7/6), moderate to strong HCl reaction, poorly fossiliferous	|	
20	13.0 13.2					|	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-02	SHEET 2 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
21.8	20.0	1.1	SS-5	10-10-24 (34)	Silty Sand (SM) 20.0-21.1' - grayish yellow, (5Y 8/4), wet, dense, fine to medium grained, moderate to strong HCl reaction, 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	Driller's Remark: softened drilling at 16.5-20.0' 13:27 Driller's Remark: 21.5' hard drilling, soft again at 23.0'	
	21.5						
25	25.0	0.8	SS-6	47-50/4 (100")	Silt (ML) 25.0-25.8' - grayish yellow, (5Y 8/4), wet, nonplastic, very rapid dilatancy, moderate to strong HCl reaction, 10-15% very fine to fine grained, 5-10% fine grained silica sand white particles, homogeneous, all carbonate	13:50 Driller's Remark: 26.5' hard drilling 13:55 Driller's Remark: 28.5-29.5' soft drilling	
16.8	25.8						
30	30.0	1.3	SS-7	48-39-37 (76)	Silt With Sand (ML) 30.0-31.3' - Same as 25.0-25.8' except yellowish gray to moderate yellow, (5Y 8/4 to 5Y 7/6), wet, nonplastic, very rapid dilatancy, 20-25% very fine to medium grained silica sand	14:08 Driller's Remark: hardened drilling at 34.0'	
11.8	31.5						
35	35.0	0.3	SS-8	50/3 (50/3")	Silty Gravel With Sands (GM) 35.0-35.3' - moderate yellowish brown, (10YR 5/4), wet, dense, mild to moderate HCl reaction, fine gravel-sized angular to subangular limestone fragments, 30% fine to coarse grained silica sand-sized, 25% low plastic fines	14:23 Remove silt/sand cuttings from mud vat, add 1/4 bag bentonite before continuing down hole to 40' 14:34 Driller's Remark: Observe light to moderate drill chatter and bouncing	
6.8	35.3						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-02	SHEET 3 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
1.8	40.0	1.5	SS-9	50-46-37 (83)		
	41.5					
45	45.0	1.1	SS-10	16-34-50/3 (84/9")		15:24 45-50' with very light chatter intermittently
-3.2	46.3					Driller's Remark: 48.5' to bottom was soft drilling (very soft)
50	50.0	0.5	SS-11	40-50/0.5 (90/6.5")		15:45 Driller's Remark: 50% circulation loss
-8.2	50.5					15:54 Driller's Remark: 52.0-53.0' soft drilling
55	55.0	0.3	SS-12	50/4 (50/4")		16:22 Driller's Remark: last SS/SPT for B-2R, will switch to NQ coring assembly, will install 55' of 3" NW
-13.2	55.3					8:07 Water level on 4/19/07 is 1.2'
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-02	SHEET 4 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
55.5	R1-NQ 5 ft 76%	62	NR				No Recovery 55.5-56.7'	3" NW casing is set to 55.5'; 50 lb bags of QuikGel brand bentonite 8:57 Total depth tape measured at 55.5' below ground surface 9:12 Added 1/8 bag to mud vat SC-1 collected at 57.0-58.15' R1: 13 minutes
			3	56.75, 56.85' - Fractures (2), rough, undulating, open <1/8"-1/4"			Limestone 56.7-57.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, 30-35% spheroidal voids <1/16"	
			1	57.0' - Fracture, horizontal, rough, undulating, open <1/2"-1/16"			57.0-60.5' - olive gray with yellow gray mottling, (5Y 3/2 with 5Y 7/2), moderate HCl reaction, highly laminated in black discontinuous ribbons (<1/16" thick), voids <1/16" up to 20% of surface, 60.0-60.5' is yellowish gray (5Y 7/2) with 10-15% fine to medium grained organic black fragments horizontally aligned, laminations are horizontal then grade to wavy downward	
			0	58.1' - Fracture, 60 deg, rough, undulating, tight			60.5-61.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), voids <1/16" over 20-25% of surface, poorly fossiliferous (casts up to 3/8"), 10% short black discontinuous laminae <1/16" thick	
60 -18.2			2				61.5-65.0' - dusky yellow, (5Y 6/4), mild HCl reaction, very weak (R1), 35-40% voids up to 1/16", trace 3/16" elongated cavities, poorly fossiliferous (casts 3/16"), trace voids infilled with medium gray mineralization, medium gray staining over interval	
60.5	R2-NQ 5 ft 90%	75	0	60.55' - Mechanical break, rough, undulating, tight, fragments in rock matrix to 1/4"			No Recovery 65.0-65.5'	R2: 3 minutes
			0	61.5' - Mechanical break, horizontal			Limestone 65.5-70.5' - dusky yellow, (5Y 6/4), very fine grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/16" over 25-35% of surface, medium gray staining over 20% of surface, powdery feel in sections of core run	
			0	62.15' - Mechanical break, horizontal, rough, undulating, tight			70.5-73.55' - moderate brown to grayish brown, (5Y 4/4 to 5Y 3/2), moderate HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16" spheroidal over 30-40% of surface, trace 1/4"x3/16" elongated cavities, poorly fossiliferous (casts up to 1/4") 1" thick extremely weak (R0) rock layer at 72.1'	
			0	62.4, 62.9' - Mechanical break (2), horizontal, rough, undulating, tight				
65 -23.2			1	63.0' - Mechanical break, 3-7 deg, rough, undulating, tight				
65.5	R3-NQ 5 ft 100%	98	NR	64.5' - Mechanical break or bedding plane, horizontal, rough, undulating, open 1/4"-1"				R3: 8 minutes
			1	64.8' - Fracture or mechanical break, 75-85 deg, rough, undulating, tight				
			0	65.6' - Mechanical break or bedding plane, horizontal, rough, planar, open 1/4"				
			0	66.15' - Mechanical break, horizontal to 5 deg				
70 -28.2			2	67.3, 67.5' - Mechanical break (2)				
70.5	R4-NQ 5 ft 91%	77	1	68.55' - Fracture or bedding plane, rough, undulating, tight				11:10 Additional 0.35' recovered during R5-NQ core run which belongs in the R4-NQ data. Driller's Remark: Able to identify redrill marks on core pieces R4: 10 minutes
			0	69.4' - Fracture or mechanical break, horizontal, rough, undulating, open up to 5/8"				
			1	69.8' - Fracture or mechanical break, horizontal, rough, undulating, tight to open 1/4", vertical stress joints from 69.8-70.35'				
			0	72.1' - Bedding plane, horizontal, rough, undulating, carbonate fine infill up to 1/4" thick				
75 -33.2			1	72.8, 72.95, 73.1' - Mechanical break (3)				
75.5	NR	NR	1	73.55' - Bedding plane, 20-30 deg, rough, undulating, contact with extremely weak rock (R0) below and medium strong to strong (R3 to R4) rock above				
			2					
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
80 -38.2	R5-NQ 5 ft 98%	80	3	74.65' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to open 1/8"	[Symbolic Log]	Limestone 73.55-75.05' - pale greenish yellow to yellowish gray, (10Y 8/2 to 5Y 7/2), very fine grained, strong HCl reaction, very weak (R1), voids /16" over 10-15% of surface, poorly fossiliferous (casts up to 3/8"x1/8", powdery feel, trace black staining in casts) No Recovery 75.05-75.5' Limestone 75.5-76.5' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), 35-40% of this interval is medium gray (N5), medium grained, granular appearance 76.5-78.75' - light olive gray to moderate brown, (5Y 5/2 to 5Y 4/4), medium strong (R3), voids to 1/16" over 40% of surface, dark gray (N3) infill, trace casts up to 3/8", trace of 1/2" organic fragments 78.75-80.4' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), trace 1"-1-1/2" cavities infilled with secondary mineralization No Recovery 80.4-80.5' Limestone 80.5-84.9' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), moderate to strong HCl reaction, medium strong (R3), voids up to 1/16" over 20-25% of surface, moderately fossiliferous (casts up to 5/8"), trace medium grain black organic fragments throughout, laminations of 3/16" thick over upper most 0.2' No Recovery 84.9-85.5' Limestone 85.5-90.5' - light olive brown mottled olive gray, (5Y 5/6 mottled 5Y 3/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts, molds, microforams), yellowish gray (5Y 8/1) material as replacement infill of echinoderms, 5-10% olive gray (5Y 4/1) wavy laminations throughout interval, up to 20% bioturbated zones filled with both yellowish gray (5Y 8/1) infill around edges and medium dark gray (N4) infill inside/center, very light gray (N7) carbonate silt mottling (hard) over the last 1.0' of run, 5-10% organics (black medium grain sized fragments) as short laminations	R5: 11 minutes
			3	74.75' - Bedding plane or mechanical break, horizontal, smooth, planar, tight			
			0	75.6' - Fracture, 40 deg, smooth, planar, tight, through very weak rock (R1)			
			0	75.75' - Fracture, 30 deg, smooth, planar, tight, through very weak rock (R1)			
			0	75.8' - Fracture, 20 deg, smooth, planar, tight, through very weak rock (R1)			
	85 -43.2	R6-NQ 5 ft 88%	82	NR			76.5' - Fracture or bedding plane, horizontal, rough, undulating, open 5/8"
				1			76.8' - Fracture, 20-30 deg, rough, planar, open 1/8"
				1			77.05' - Fracture or mechanical break, horizontal-5 deg, rough, undulating, tight
				0			77.95' - Mechanical break, horizontal, rough, undulating, tight
				0			80.9' - Bedding plane or mechanical break, horizontal, rough, undulating, tight
90 -48.2	R7-NQ 5 ft 100%	100	1	81.95' - Fracture, 30 deg, rough, undulating, open 1/8"-5/8"			
			NR	84.61' - Fracture or mechanical break, horizontal, rough, undulating, open 1/8"-1/2"			
			0				
			0	87.6, 88.0, 89.7' - Mechanical break (3), horizontal, rough, undulating, tight			
			0				
95 -53.2	R8-NQ 5 ft 100%	98	0				
			2	91.9-92.0' - Fracture, horizontal, slickensided, undulating, clay infill, dry, soft clay 0.1' thick			
			0	92.4, 93.0' - Mechanical break (2), horizontal, rough, undulating, tight			
			1	94.0' - Fracture, 40-50 deg, rough, undulating, tight to open 1/8" (fossil mold 1-1/4" x 1/2" on fracture surface), fossils are whole spiral shaped casts			
			0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
100 -58.2	R9-NQ 5 ft 96%	93	0	0	96.2' - Mechanical break, horizontal-5 deg, rough, undulating, tight	[Symbolic Log]	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 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 HCl 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 voids 1/8"x1/8", trace medium dark gray (N4), fine grained fragments in matrix, trace black short 3/8" discontinuous organic laminations, "powdery" chalk-like feel over entire run No Recovery 100.3-100.5' Limestone 100.5-105.5' - Same as 105.5-110.5' 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 fragments throughout run, spheroidal to subrounded voids <1/16" over 20-25% of surface, 130.5-131.2 is without olive mottling 105.5-110.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), voids up to 1/16" over 35-40% 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 casts and shell patterns 110.5-115.45' - no visible coral shaped casts, casts of echinoderms/ ostracods 1/4"x1/16" with white calcite mineral replacement	R9: 4 minutes	
			0	0	97.7' - Fracture, horizontal, rough, undulating, tight to open 1/4", breakage in area with 3/4" size fossil casts and 3/8" spiral shaped casts				
			1	0	98.0, 99.0, 99.2' - Mechanical break (3)				
			0	0					
			NR	0					
	105 -63.2	R10-NQ 5 ft 100%	97	1	0			100.7' - Fracture or mechanical break, horizontal, rough, undulating, open 1/16"	R10: 5 minutes
				0	0				
				0	0			103.0' - Mechanical break	
				0	0				
				0	0				
110 -68.2	R11-NQ 5 ft 100%	83	0	2	106.3-109.0' - Fracture, vertical, large >2" sized fossil molds and casts along surface	R11: 7 minutes			
			2	1	106.65' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			1	2	106.95' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			2	0	107.65' - Fracture, vertical, rough, undulating, >2" size fossil casts or molds along surface				
			0	0	108.5' - Fracture or mechanical break, horizontal, rough, undulating, tight				
	115 -73.2	R12-NQ 5 ft 99%	99	0	1		108.7' - Fracture or mechanical break, horizontal, rough, undulating, tight	R12: 5 minutes	
				1	0		111.45' - Fracture or mechanical break, horizontal, rough, undulating, tight		
				0	0		113.0' - Mechanical break		
				0	0				
				0	0		114.3' - Fracture, 20 deg, rough, undulating, open 1/8"-1/4"		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
120 -78.2	R13-NQ 5 ft 100%	97	1	115.7' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", surfaces of fracture have molds or voids filled with secondary mineralization		No Recovery 115.45-115.5' Limestone 115.5-120.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), very fossiliferous, microforams, casts of echinoderms/ ostracods with yellowish gray (5Y 7/2) replacement mineralization, olive gray (5Y 3/2) thin beds and laminations at 116.0', medium light gray staining from 118.0-119.0', rock sample contains 25-35% medium grain, medium dark gray (N4) fragments in rock matrix, overall the sample has a "gritty" feel	SC-3 collected at 114.5-115.5'
			0	116.9' - Mechanical break, 50-60 deg, rough, undulating, tight			
			0				
			1				
			0				
125 -83.2	R14-NQ 5 ft 98%	80	1	121.35, 121.5, 121.75, 122.05' - Fracture or mechanical break (4), horizontal, rough, undulating, open 1/16"-1/8"		120.5-125.4' - yellowish gray, (5Y 7/2), strong HCl reaction, weak (R2), voids <1/16" over 30-40% of surface, olive gray (5Y 3/2) staining over 20% of rock (122.0-122.7' and 124.0-124.45'), extremely weak (R0) rock at 124.35', very fine grained limestone bed from 121.35-121.75', medium strong, highly fossiliferous (microforams, casts), trace molds with white mineral replacement	R13: 8 minutes
			3				
			2	122.7' - Mechanical break, horizontal, rough, undulating, tight			
			2	123.0' - Mechanical break 123.35, 124.45' - Bedding plane (2), horizontal, rough, undulating, open 1/16"			
			0	123.5' - Bedding plane or mechanical break, rough, undulating, open up to 1/2"			
			0	123.75' - Mechanical break, horizontal, rough, undulating, tight			
130 -88.2	R15-NQ 5 ft 100%	97	0			No Recovery 125.4-125.5' Limestone 125.5-130.5' - yellowish gray and olive gray, (5Y 7/2 and 5Y 5/2), wavy bedded, strong HCl reaction, very weak (R1), voids <1/16" over 5-10% of surface, trace molds with white calcite mineral replacement at sizes of 5/8"x1/8" and 3/16"x1/16", medium dark gray (N4), medium grain particles over 30-40% of rock matrix	R14: 7 minutes
			0				
			0	127.5, 127.65, 128.0' - Mechanical break (3), horizontal, rough, undulating			
			1	129.0, 129.5' - Bedding plane (2), horizontal, rough, planar, tight			
			2	129.75' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4"			
135 -93.2	R16-NQ 5 ft 96%	78	0			130.5-135.3' - Same as 125.5-130.5' except no molds with replacement mineralization, casts up to 5/8" (spiral shapes without infilling), more thinly bedded than 125.5-130.5'	R15: 8 minutes
			1				
			3	132.15' - Fracture, 20 deg, rough, planar, tight			
			4	132.75' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
			4	132.95, 133.1' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight			
			0	133.7' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"			
			133.95, 134.0' - Bedding plane or fracture, horizontal, smooth, undulating, tight			SC-4 collected at 134.35-135.3'	



PROJECT NUMBER: 338884.FL		BORING NUMBER: B-02	
		SHEET 8 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 4/18/07 START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -98.2	R17-NQ 5 ft 100%	100	NR 0		No Recovery 135.3-135.5' Limestone 135.5-136.8' - Same as 125.5-130.5'	R17: 9 minutes	
			1		136.8' - intact discontinuity		
			0		136.8-138.6' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, very weak (R1), chalk-like feel, medium dark gray (N4) particles over 25-30% of matrix, 5-7% medium dark gray (N4) subrounded cavities up to 5/8"		
			1		138.55' - Bedding plane or mechanical break, rough, undulating, open 5/8", exposed filled cavities on surfaces		
			0		138.6-142.8' - variegated yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids increasing with depth (1/16") ranging from 1-2% to 15-20%, fossil molds/casts common with cavities 1-3/16" - 1-9/16" x 3/4" - 1-3/16" penetrating deep into core, few cavities filled with very weak (R0) limestone with voids more than 40-50% decreasing with depth		
			2		140.35' - Mechanical break, horizontal, rough, undulating, tight		
145 -103.2	R18-NQ 5 ft 98%	82	2		140.85' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	Driller's Remark: 144.0-144.5' 50-75% loss of circulation in a void (space approximately 80%) R18: 9 minutes SC-5 collected at 144.4-145.4'	
			2		141.55' - Fracture or mechanical break, horizontal, rough, undulating, open up to 3/4"		
			1		141.7' - Bedding plane, horizontal, rough, undulating, <1/32" brownish black organic material infill over 100% surface, tight		
			2		142.8' - Bedding plane, horizontal, rough, undulating, tight, horizontal mottling surface		
			0		144.2' - Fracture, 30 deg, rough, undulating		
150 -108.2	R19-NQ 5 ft 100%	92	1		144.4' - Fracture or mechanical break, horizontal, rough, undulating, open 1/2"	R19: 5 minutes	
			0		145.7' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"		
			0		147.7, 147.9' - Mechanical break (2), horizontal, rough, undulating, tight		
			2		148.55, 148.6' - Bedding plane (2), horizontal, rough, undulating, crumbled rock fragment between surfaces		
			0		148.7-150.5' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, medium strong to weak (R3 to R2), very faintly mottled, voids up to 1/16" over 3-5% of surface, cavities rare (<1/16"x3/16")	Total depth is 150.5' on 4/19/07	
					Bottom of Boring at 150.5 ft bgs on 4/19/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-03	SHEET 1 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
43.9	0.0	0.5	SS-1	1-1-1 (2)		24" split spoon, 5' AWJ rod Driller switch to N-rod, 4.75" tricone roller drill bit add 12.5lb quick gel bentonite Water level reached at ~3.0' below ground surface based upon SS-1 and SS-2 on 3/26/07 at 12:00
	1.5					
5 38.9	5.0	0.9	SS-2	6-7-9 (16)		
	6.5					
10 33.9	10.0	0.8	SS-3	5-6-7 (13)		Driller's Remark: Hitting hard rock at 13' drilling slow
	11.5					
15 28.9	15.0	1.1	SS-4	6-4-5 (9)		
	16.5					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-03	SHEET 2 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6-5-5 (10)			
23.9	20.0	1.2	SS-5	6-5-5 (10)	Lean Clay With Sand (CL) 20.0-21.2' - light gray, (N7), wet, stiff, 30% very fine to fine grained, low plasticity, slow to no dilatancy, no HCl reaction, pale green (10GB 8/2) mottling, mottled at bottom (21.2'), trace of black particles, 50% very fine to fine silica sand, trace fine gravel-sized grains		
	21.5						
25	25.0	1.3	SS-6	2-1-2 (3)	Silty Sand (SM) 25.0-26.25' - yellowish gray, (5Y 7/2), wet, very loose, medium grained, no HCl reaction, very fine to fine rounded silica sand, 20-30% nonplastic fines, trace of very fine sand-sized black particles		
18.9	26.5						
30	30.0	1.2	SS-7	2-2-3 (5)	Clayey Sand (SC) 30.0-31.2' - light olive gray mottled with greenish gray and purple streaks, (5Y 6/1 with 5GY 6/1), wet, loose, no HCl reaction, very fine to fine rounded silica sand, 20% medium plastic fines, trace very fine sand-sized black particles		
13.9	31.5						
35	35.0	1.0	SS-8	14-28-7 (35)	Silt (ML) 35.0-36.0' - light olive gray with olive black and dark yellowish brown, (5Y 5/2 with 5Y 2/1 and 10YR 4/2), wet, hard, low plasticity, rapid dilatancy, 5-10% fine sand-sized black particles, mild HCl reaction from 35.5-40.0', carbonate material, organic seam at 35.0', 0.35' thick black and brown mottling, strong organic odor		
8.9	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-03	SHEET 3 OF 8
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
3.9	40.0	1.3	SS-9	30-41-46 (87)		
	41.5					
45	45.0	1.4	SS-10	29-40-46 (86)		
-1.1	46.5					
50	50.0	0.5	SS-11	50/6 (50/6")		Start of sampling on 3/27/07 Driller's Remark: Soft drilling
-6.1	50.5					
55	55.0	0.3	SS-12	50/4.5 (50/4.5")		Light to moderate bit chatter over 1st foot (drilling from 51.5-55.0')
-11.1	55.4					Driller's Remark: Hard at 57', soft at 57.5', hard again at 58.3'
	60.0	0.2	SS-13	50/2.5 (50/2.5")		
	60.2					
60						Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-16.1	60.0 R1-NQ 1 ft 85%	85	0	60.65' - Mechanical break		Limestone 60.16-61.0' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" on 15-20% of surface, no fossils 61.0-65.9' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16"x3/16" (some infilled with very fine to medium grain mineralization) voids up to 25% of surface, extremely weak carbonate silt interval from 64.3-64.6' mottled gray from 63.5-64.5', very poorly fossiliferous (trace molds)	R1: 1 minute	
			2				Start at drilling 3/28/07, water level at surface (mud) at 7:55 =3/28/07	
			2					
	R2-NQ 5 ft 98%	65	0	63.05', 63.4' - Mechanical break				
			3					
65			1					
-21.1			NR					
			0					
			0					
	R3-NQ 5 ft 100%	78	2	68.5', 68.6' - Fractures, 50-60 deg, rough, undulating, tight, black particles on surface				
			3	68.95' - Bedding plane, <10 deg, top of extremely weak rock				
			1	69.15' - Bedding plane, 40 deg, base of extremely weak rock				
70			>10	69.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
-26.1			2	70.0' - Fracture, 60-70 deg, rough, undulating, medium black particles				
			2	71.15'-71.7' - Fracture zone, fractured rock core black stains on fractures				
			2	72.15' - Bedding plane, 0-5 deg, rough, undulating, open 5/8"				
	R4-NQ 5 ft 94%	72	2	72.75' - Bedding plane or mechanical break, horizontal, rough, planar				
			1	73.35'-74.35' - Fracture, rough, planar, no stains, curved fracture				
			1	73.95' - Fracture, 40 deg, rough, planar, tight, (bisecting curved fracture)				
75			0	74.7' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2" discontinuity between rock				
-31.1			NR					
			2	76.7' - Fracture, 80-90 deg, rough, undulating, tight				
			1	76.95' - Fracture, horizontal, rough, undulating, open up to 1"				
			1	77.25' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4"				
	R5-NQ 5 ft 98%	90	1	78.35' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"				
			1	79.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"				
80						No Recovery 75.7-76.0' R4: 23 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-36.1			2				
81.0			NR				
			2				
			0				
	R6-NQ 5 ft 96%	90	0				
			0				
85 -41.1			0				
			NR				
			2				
			0				
	R7-NQ 5 ft 100%	88	2				
			3				
90 -46.1			0				
			1				
			0				
	R8-NQ 5 ft 100%	100	0				
			0				
95 -51.1			0				
			2				
			0				
	R9-NQ 5 ft 98%	88	1				
			1				
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-03	SHEET 6 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 : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-56.1			2		99.7' - Fracture, 10 deg, rough, undulating, open			R9: 8 minutes
101.0			NR		100.65', 100.75' - Bedding plane, rough, planar, 1/16" relief (bedding plane fracture)		No Recovery 100.9-101.0' Limestone 101.0-106.0' - Same as 88.0-91.0' except highly fossiliferous at 101.3-102.1' and 103.5-104.2'	
			1		101.2' - Mechanical break			
			0		101.25' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"			
	R10-NQ 5 ft 100%	96	0		103.5', 104.2' - Mechanical break (2)			
105			0		104.25', 104.7', 105.25', 105.65' - Mechanical break (4), horizontal, rough, undulating, tight			R10: 8 minutes
-61.1			0					
106.0			0				106.0-109.0' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), gray mottling, staining over 106.0-109.0', 10-15% spherical voids (<1/16"), poorly fossiliferous (molds mostly casts up to 1/8" in size), 25-30% very fine grain white and dark gray particles	
			0					
	R11-NQ 5 ft 100%	92	1		108.6' - Fracture, 60-70 deg, rough, undulating, tight		109.0-111.0' - Same as 106.0-109.0' except yellowish gray, (5Y 8/1)	
110			2		109.0' - Bedding plane or mechanical break, horizontal, smooth, planar			R11: 7 minutes
-66.1			2		109.8' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"			
			2		110.2' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"			
			1		110.35' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 5/8"		111.0-113.0' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), up to 10% elongated cavities up to 1/4"x1/2" rimmed with secondary mineralization, trace fossil casts up to 1/2"	
			2		111.3' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" open			
	R12-NQ 5 ft 100%	80	2		111.6' - Mechanical break, <10 deg, rough, undulating, tight		113.0-116.0' - white, (N9), strong HCl reaction, very weak to weak (R1 to R2), mottled with soft white clay, poorly fossiliferous (casts and molds up to 1/4") more larger voids, voids are spheroidal and up to 1/16", no infill	
115			1		112.0' - Mechanical break, <10 deg, rough, undulating, tight			R12: 5 minutes
-71.1			1		112.9' - Mechanical break or bedding plane, <10 deg, rough, undulating, tight			
			1		113.7-113.95' - Fracture zone, rough, undulating, gray stains, also brown stains			
			1		114.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
			1		115.35' - Bedding plane or mechanical break, rough, undulating, tight to 1/8" gap		116.0-119.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), grades from moderate to highly fossiliferous from 116.0-119.0' (casts, molds) up to 1/2"x1/2" micro fossils, gray staining predominantly over 117.0-119.0'	
			5		116.45' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/4"			SC-3 collected at 115.1-116.0'
			5		117.2' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
	R13-NQ 5 ft 100%	72	1		117.4' - Fracture, 60-70 deg, rough, undulating, open 1/8"			
			1		117.55' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8"			
120			2		117.65' - Mechanical break, horizontal, smooth, planar, open 1/8"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-76.1			1		Limestone 119.5'-120.5' - Same as 116.0'-119.5' except grayish yellow, (5Y 8/4), up to 25% spheroidal voids (<1/16")	R13: 7 minutes	
121.0			2		118.25' - Mechanical break or bedding plane, <10 deg, rough, undulating, tight	Chalk like or powder like rock, this run contains rock with vertical fractures-possible stress related to over burden	
			0		119.45' - Mechanical break or bedding plane, <10 deg, rough, undulating, dark gray stains, open up to 1/2"		
	R14-NQ 5 ft 80%	75	2		119.65' - Bedding plane, horizontal 120.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" gap		
			1		121.75' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 121.85' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		
125			NR		123.05' - Bedding plane or mechanical break, horizontal, rough, planar, tight		
-81.1					123.35, 123.55' - Mechanical break 123.9' - Mechanical break, rough, planar, tight	SC-4 collected at 124.5-125.0' R14: 5 minutes Driller's Remark: Soft drilling at 124.5-125.0'	
			1		124.05' - Mechanical break or bedding plane, smooth, planar, tight	R15: 7 minutes Driller's Remark: Soft lense from 127.0-128.0' Appears similar to 90-115', a vertical fracture in this interval is over 1.5' long	
			2		126.5' - Mechanical break or bedding plane, horizontal, rough, planar, open 1/16"		
	R15-NQ 5 ft 72%	52	2		127.0' - Mechanical break, horizontal, rough, undulating, tight		
			2		127.3-127.45' - Fracture zone 128.3' - Mechanical break or bedding plane, horizontal, rough, undulating, open 1/16"		
			NR		128.8' - Mechanical break, horizontal, rough, undulating, tight		
130					129.02-129.05' - Fracture zone 129.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, assume core loss from bottom of run	R16: 7 minutes	
-86.1			>10		132.0' - Mechanical break, horizontal, rough, planar, for horizontals, vertical stained set of fractures at 132', 80-100% surface covered.		
			>10				
	R16-NQ 5 ft 80%	10	>10				
			2				
135					No Recovery 135.0-136.0'		
-91.1			NR		Limestone 131.0-135.0' - Same as 126.0-128.5' except bottom most 0.5' returns to "clean" un-stained yellowish gray (5Y 8/1)		
			>10				
	R17-NQ 5 ft 96%	64	>10		137.45' - Bedding plane, 15-20 deg, brownish black stains, tight 137.8-138.15' - Fracture zone, up to 2" subrounded pieces 138.35' - Fracture or mechanical break, 70-80 deg		
			2				
140							



PROJECT NUMBER:
338884.FL

BORING NUMBER:
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

WATER LEVELS : 3.0 ft bgs on 3/26/07 START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-96.1			1		Limestone 137.45-140.8' - white to yellowish 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" No Recovery 140.8-141.0' Limestone 141.0-146.0' - light olive gray, strong HCl reaction, weak (R2), 5-10% spherical voids up to 1/8"x1/8" laminated rim <1/16" thick over entire interval, trace cavities up to 3/8"x1/16" elongated with secondary 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 fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/16"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 mineralization, rock has powdery feel to touch Bottom of Boring at 151.2 ft bgs on 4/3/2007	R17: 8 minutes Stopped drilling at 141.0' on 3/28/07 Starts drilling from 141.0' on 3/29/07, 08:01 water level to 3'10" below ground surface in NQ barrel R18: 9 minutes 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	
141.0		NR	1				
			1				
			0				
			1				
			0				
145			2				
-101.1			0				
			1				
			2				
			1				
150			0				
-106.1							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 1 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.8	0.0	1.1	SS-1	1-2-2 (4)	Topsoil 0.0-0.15' - brownish black, (5YR 2/1), moist, 30-35% roots Poorly Graded Sand With Organics (SP) 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		Samples taken using 5' sections of N-rod, 3-7/8" tricone drag bit, 50 lb bags of quick gel brand bentonite 08:40 Water level at 3.0' below ground surface based on SS-1 moist, SS-2 wet
	1.5						
5	5.0						
37.8		1.0	SS-2	2-2-2 (4)	Poorly Graded Sand (SP) 5.0-6.0' - grayish orange to pale yellowish brown mottled with trace dusky brown, (10YR 7/4 to 10YR 6/2 with 5YR 2/2), wet, very fine to fine grained, trace to 3% nonplastic fines, trace very fine sand-sized black particles, silica sand		
	6.5						
10	10.0						
32.8		0.9	SS-3	4-6-7 (13)	Poorly Graded Sand To Clayey Sand (SP-SC) 10.0-10.9' - yellowish gray, (5Y 7/2), wet, very fine to fine grained, grading from sand (SP) to clayey silt (SC) with depth, trace nonplastic fines in SP, 25-30% low to medium plastic fines in SC, trace of angular shaped black particles		
	11.5						
15	15.0						
27.8		1.2	SS-4	7-10-12 (22)	Silty Sand (SM) 15.0-16.2' - yellowish gray, (5Y 7/2), wet, medium dense, very fine to fine grained, 25-30% nonplastic fines, very fine black particles, 3/8" thick vertically 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		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 2 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
22.8	20.0	1.2	SS-5	9-10-9 (19)	Silty Sand (SM) 20.0-21.2' - yellowish gray, (5Y 7/2), wet, very fine to fine grained, 14% nonplastic fines, trace very fine angular black particles, silica sand		
	21.5						
25	25.0	1.3	SS-6	5-6-5 (11)	Clayey Sand (SC) 25.0-25.1' - dark yellowish orange, (10YR 6/6), moist, very fine to fine grained, 30-35% medium plastic fines, silica sand		
17.8	26.5				Sandy Fat Clay (CH) 25.1-25.4' - greenish gray, (5GY 6/1), moist, stiff, medium to high plasticity, no to slow dilatancy, 30% fine silica sands laminated with very light gray (N8), very fine to fine silica sands about 1/6" thick, light brown (5YR 5/6) laminations <1/16" thick		
					Fat Clay (CH) 25.4-25.7' - grayish black, (N2), moist, high plasticity, no dilatancy		
30	30.0	1.4	SS-7	7-11-41 (52)	Silty Sand (SM) 25.7-26.0' - light brown, (5YR 5/6), wet, fine to medium grained, strong HCl reaction, 25-30% low plastic fines carbonate derived		
12.8	31.5				Silty Sand (SM) 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		09:36 Driller's Remark: Will change to 3-7/8" tricone roller bit
					Silty Sand With Gravel (SM) 30.0-31.4' - yellowish gray with moderate yellow and 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	1.5	SS-8	3-4-14 (18)	Interbedded Silt With Sand (ML) 35.0-36.5' - medium light gray mottled with medium dark gray interbedded with very pale orange mottled with yellowish gray, (N6 mottled with N4 interbedded with 10YR 8/2 mottled with 5Y 8/1), moist, low plasticity, strong to very strong HCl reaction, 20-25% very fine to fine grained sand, 1" angular limestone fragments at bottom of sample		
7.8	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 3 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
		6"-6"-6" (N)		6"-6"-6" (N)			
2.8	40.0	1.4	SS-9	5-5-9 (14)	Silt With Sand (ML) 40.0-41.4' - light gray mottled with yellowish gray, (N7 mottled with 5Y 7/2), wet, nonplastic, rapid dilatancy, very strong HCl reaction, 20% very fine to fine sand, all carbonate		
	41.5						
45	45.0	1.5	SS-10	6-10-14 (24)	Elastic Silt With Sand And Limestone Fragments (MH) 45.0-46.5' - medium light gray, (N7), wet, low to medium plasticity, rapid dilatancy, very strong HCl reaction, 25% fine to medium grained sand, 10-15% fine to coarse grained gravel limestone fragments, all carbonate		
-2.2	46.5						
50	50.0	1.0	SS-11	17-17-18 (35)	Silty Sand (SM) 50.0-51.0' - medium gray, (N5), wet, dense, fine to coarse grained, very strong HCl reaction, predominantly fossils including shell fragments, 20% low plastic fines		
-7.2	51.5						
55	55.0	1.5	SS-12	15-24-33 (57)	Sandy Silt (ML) 55.0-56.5' - very light gray, (N8), wet, low plasticity, rapid dilatancy, very strong HCl reaction, 30% fine to coarse grained sand, fossils and fossil fragments ranging from yellowish gray to medium dark gray (5Y 5/1 to 5Y 8/1)		
-12.2	56.5						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 4 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				65-6"-6" (N)			
-17.2	60.0	1.5	SS-13	28-27-24 (51)	Silty Sand With Gravel (SM) 60.0-61.5' - medium light gray, (N6), wet, very dense, fine to coarse grained, very strong HCl reaction, predominantly fossil fragments, 25-30% low to medium plastic fines, 15% fine gravel-sized fragments composed of shale fragments	10:58 Driller's Remark: Change mud vat, add 1/4 bag (50 lb), quick gel bentonite	
	61.5						
65 -22.2	65.0	0.8	SS-14	37-50/4.0 (87/10")	Silty Sand (SM) 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		
	65.8						
70 -27.2	70.0	1.5	SS-15	24-26-30 (56)	Silty Sand (SM) 70.0-71.5' - Same as 65.0-65.9'		
	71.5						
75 -32.2	75.0	1.5	SS-16	11-12-15 (27)	Clay With Sand (CL) 75.0-75.8' - grayish green mottled with grayish green and brownish black, (10GY 5/2 mottled with 10G 4/2 and 5Y 2/1), moist, very stiff, high plasticity, no dilatancy, mild HCl reaction, 25% very fine to fine silica sand; irregular shaped, laminated bedding; brownish black material may be organics 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'	Transitional boundary between CH/MH subunits	
	76.5						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 5 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-37.2	80.0	0.9	SS-17	18-50/4.5 (68/10.5")		14:29 Driller's Remark: Observed hard drilling light rig bouncing
	80.9					
85	85.0					14:49 Driller's Remark: Light rig bouncing over entire 5-foot run to 90'
-42.2	85.2	0.1	SS-18	50/2 (50/2")		
90	90.0					
-47.2	90.3	0.3	SS-19	50/4 (50/4")		
95	95.0					
-52.2	95.9	0.7	SS-20	40-50/4.5 (90/10.5")		
100						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 6 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				50/4 (50/4")			
-57.2	100.0	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 sample of 4/10/07, end of drilling 08:15 Water level at 2.5' below ground surface on 4/11/07 4/11/07 Adding 5' sections of AWJ to reach depth
105 -62.2	105.0	0.8	SS-22	41-50/5.5 (91/11.5")	Silt With Sand (ML) 105.0-105.8' - yellowish gray mottled with gray, (5Y 8/1 mottled with N5), moist, low plasticity, rapid 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	|||	09:44 Starting drilling to 105' added 1/2 bag bentonite
	106.0						
110 -67.2	110.0	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 carbonate	|||	10:36 Driller's Remark: 33-50/5" (83/11") Add 1/2 bag bentonite to mud vat
	110.9						
115 -72.2	115.0	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 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)	|||	
	116.5						
120							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 7 OF 8
SOIL BORING LOG		

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 bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
	-77.2	120.4						0.3	SS-25	50/5 (50/5")	Silt With Sand And Limestone Fragments (ML) 120.0-120.3' - yellowish gray, (5Y 8/1), moist, strong HCl reaction, 50% limestone fragments, 20% fine to medium sand-sized material, all carbonate
125 -82.2	125.0 125.3	0.2	SS-26	50/3 (50/3")	Silt (ML) 125.0-125.2' - yellowish gray, (5Y 8/1), moist, low plasticity, rapid dilatancy, strong HCl reaction, 5-10% fine to medium sand-sized, all carbonate		
130 -87.2	130.0 130.3	0.3	SS-27	50/3 (50/3")	Silt With Sand (ML) 130.0-130.3' - Same as 125.0-125.2' except 20-25% fine to coarse sand-sized material		14:20 Driller's Remark: Light rig chatter at 133.5', 131.5'
135 -92.2	135.0 135.9	0.1	SS-28	50/1 (50/1")	Limestone Fragment 135.0-135.1' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, trace olive gray (5Y 3/2) staining, fossil casts, fragment is a 1" disc shaped Begin Rock Coring at 136.0 ft bgs See the next sheet for the rock core log		15:02 Driller's Remark: Will switch to NQ coring, last soil sample for B-4 boring
140							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04	SHEET 8 OF 8
ROCK CORE LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/10/07 START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
136.0	R1-NQ 5 ft 92%	74	2	136.5, 136.9' - Fractures (2), horizontal, rough, undulating	Limestone 136.0-137.35' - light olive gray, (5Y 5/2), fine to medium grained, strong HCl reaction, medium strong (R3), voids (<1/16") on 20% of surface, cavities (3/16" - 1-3/4"), secondary crystallization in 35-40% of surface, fossiliferous 137.35-137.39' - light olive gray, (5Y 5/2), very fine grained, moderate to mild HCl reaction, extremely weak (R0), fine wavy laminations 137.39-140.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong to extremely strong HCl reaction, weak to medium strong (R2 to R3), weaker with depth, voids (<1/16") on <5% of surface, irregular laminations, powder feel increases with depth, shell fragments, fossiliferous (casts, molds) No Recovery 140.6-141.0' Limestone 141.0-145.9' - transition from yellowish gray to light olive gray, (5Y 8/1 to 5Y 5/2), fine to medium grained, extremely strong HCl reaction, very weak to weak (R1 to R2), fines increase with depth, voids (<1/16") over 40-50% of surface, fossiliferous casts and molds mainly in weaker rock 144.0-145.9', dark gray stains at 144.5' No Recovery 145.9-146.0' Limestone 146.0-149.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 20% of rock, black organic staining, secondary crystallization in voids, poorly fossiliferous (casts/molds) No Recovery 149.6-151.0'	4/12/07 Start coring at 09:40:15 from 136-141' The interval from 135.0-136.0' was drilled down to set a 5' stroke; no data for 135.0-136.0' is available 07:45 Water level at 7' 10"			
140 -97.2			2	137.3' - Fracture or bedding plane, horizontal, smooth			R1: 25 minutes		
141.0			1	137.35' - Fracture, horizontal, smooth				R2-NQ is the first run on 4/17/07 08:45 Water level at 6.5' below ground surface	
			2	137.8, 138.5' - Fractures (2), horizontal, rough, undulating					R2: 8 minutes
			NR	139.8' - Fracture, <10 deg, rough, undulating						Driller's Remark: Loss of circulation 100% at 146.5' SC-1 collected at 147.35-148.4'
145 -102.2	>10	140.4' - Fracture, 20-30 deg, rough, undulating	R3: 4 minutes End of B-4 boring at 151.0' below ground surface on 4/17/07						
	>10	141.6-142.6' - Fracture zone, 70-80 deg, rough, <20 deg at 142.6' and 146.6', rough, undulating		Bottom of Boring at 151.0 ft bgs on 4/14/2007					
	0	143.1, 143.5' - Mechanical break (2)							
	1	144.0' - Mechanical break or bedding plane, horizontal, open 3/8", clay infill, very soft							
146.0	NR	145.45' - Fracture or mechanical break, 50-60 deg, rough, undulating, black staining on 70% surface							
	>10	145.75' - Bedding plane or fracture, vertical, rough, undulating, black stains on 60-70% of surface, tight							
	2	146.1, 146.2, 146.45, 146.55' - Mechanical break or bedding plane (4), rough, undulating, tight, broken along wavy bedded laminations, organic beds (<1/16")							
150 -107.2	5	147.05' - Fracture or bedding plane, horizontal, rough, undulating, open 1/8", black stains over 25% of surface							
	4	147.4' - Fracture, 20-30 deg, rough, undulating, black staining over 100% of surface, open 1/32"							
	NR	148.5' - Fracture, 40 deg, rough, undulating, 100% black staining, tight							
151.0		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"							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 25.0 ft bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
42.0	0.0	1.3	SS-1	1-2-3 (5)	Poorly Graded Sand Grading To Poorly Graded Sand With Silt (SP) 0.0-1.3' - light gray grading to dark yellowish orange, (N7 to 10YR 6/6), moist, no HCl reaction, trace to 10-15% nonplastic fines, very fine to fine silica sand, trace roots		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)"
	1.5						
5	5.0	0.9	SS-2	3-6-7 (13)	Silty Sand (SM) 5.0-5.3' - black with orange staining, matrix is dark yellowish orange, (10YR 6/6), wet, loose, no HCl reaction, predominantly coarse sand to 3/16", 20% nonplastic fines, angular to rounded sand Clayey Sand (SC) 5.3-5.6' - dusky yellow green, (5GY 5/2), moist, no HCl reaction, very fine to fine silica sand, 35% stiff clay with medium to high plasticity Silt With Sand (ML) 5.6-5.9' - yellowish gray, (5Y 8/1), wet, nonplastic, mild HCl reaction, 15-20% very fine sand-sized, carbonate material, trace fine to medium black sand-like 5.0-5.3' (possibly pyrite)		Sand in 5.0-5.3' may be pyrite
37.0	6.5						
10	10.0	0.4	SS-3	9-8-7 (15)	Silt With Sand (ml) To Silty Sand (SM) 10.0-10.4' - grayish orange, (10YR 7/4), wet, medium dense, very fine to fine grained, mild to moderate HCl reaction, nonplastic fines, carbonate material, sample is 50% ML and 50% SM, trace black sand		Driller's Remark: change at 9.0'
32.0	11.5						
15	15.0	1.0	SS-4	2-3-11 (14)	Silty Sand (SM) 15.0-16.0' - yellowish gray, (5Y 8/1), with mottling and streaking, wet, nonplastic, mild to moderate HCl reaction, 51% fine sand, trace fine gravel-sized (limestone) fragments, carbonate material		Driller's Remark: 10-15% circulation loss at 16.5'
27.0	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 2 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 25.0 ft bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.0	20.0	0.7	SS-5	22-22-12 (34)	Silty Sand (SM) 20.0-20.7' - pale yellowish gray, (5Y 8/1), wet, dense, medium to coarse grained, mild HCl reaction, 45% nonplastic fines, carbonate material		Blind drill to 20.0' after moving drill rig due to split spoon shoe lost in previous hole Begin SPTs at 20.0'. Each of the following samples belong to the redrilled hole B-04A.
	21.5						
25	25.0						
17.0	25.5	0.4	SS-6	50/5.5 (50/5.5")	Silt (ML) 25.0-25.4' - grayish orange, (10YR 7/4), wet, nonplastic, mild to moderate HCl reaction, trace to 10% fine to medium sand-sized material, streaks of white in matrix and trace fine sand-sized green material, carbonate material		
30	30.0						
12.0	31.5	0.6	SS-7	13-8-3 (11)	Silt With Sand (ML) 30.0-30.6' - grayish orange, (10YR 7/4), wet, nonplastic, mild HCl reaction, up to 25% fine to coarse sand-sized material decreasing with depth, carbonate material		
35	35.9						
7.0		0.0	SS-8	50/1.5 (50/1.5")	No Recovery 35.0-35.1'		Driller's Remark: some chatter at 35.0-36.0'
							Driller's Remark: smooth at 38.0'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 3 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 25.0 ft bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
2.0	40.4	0.4	SS-9	50/5 (50/5")	Silt With Sand (ML) 40.0-40.4' - olive gray, (5Y 4/1), wet, nonplastic to low plasticity, mild to moderate HCl reaction, 20-25% very fine sand, carbonate material		Driller's Remark: 35.0-40.0' fairly hard
45 -3.0	45.0 43.2	0.1	SS-10	50/2.5 (50/2.5")	Limestone Fragments 45.0-45.1' - olive gray, (5Y 4/1), mild HCl reaction, a few limestone fragments and silt as in 40.0-40.4'		
50 -8.0	50.0	1.0	SS-11	48-50-50/1 (100/7")	Silty Sand (SM) 50.0-51.0' - olive gray mottled with light gray, (5Y 4/1 mottled with 5Y 6/1), wet, very dense, fine to coarse grained, moderate HCl reaction, 30-40% low plastic fines, carbonate material		Driller's Remark: drilling remains fairly hard
55 -13.0	55.9	0.1	SS-12	50/1 (50/1")	Limestone Fragments 55.0-55.1' - olive gray, (5Y 4/1), mild to moderate HCl reaction, limestone fragments		A few limestone fragments and silt
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 4 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 25.0 ft bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-18.0	60.0	0.1	SS-13	50/1 (50/1")	Limestone Fragments 60.0-60.1' - olive gray, (5Y 4/1), moderate HCl reaction, limestone fragments		Driller's Remark: 60.0-65.0' drilling slows and becomes much harder Driller's Remark: very hard at 63.0'
65 -23.0	65.0 65.1	0.1	SS-14	50/1 (50/1")	Limestone Fragments 65.0-65.1' - Same as 60.0-60.1' Begin Rock Coring at 65.0 ft bgs See the next sheet for the rock core log		switch to rock coring, see rock core log
70 -28.0							
75 -33.0							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
-23.0	65.0	19	2	65.7, 65.85, 66.2' - Fractures (3), <10 deg, rough, undulating, open 3/16" 66.25-66.7' - Fracture, vertical, rough, undulating, changing to 30 deg over last 1" from 66.6-66.7', open 1/8" 66.9' - Fracture zone	Limestone 65.0-65.4' - pale yellowish brown, (10YR 6/2), medium grained, moderate HCl reaction, very weak (R1), voids (up to 1/8") over 30% of surface, trace casts/cavities (up to 3/8"x1/4"), poorly fossiliferous 65.4-66.9' - light olive gray, (5Y 5/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (up to 3/16") over 30% of surface, trace linear casts (1/16"x1/16"), poorly fossiliferous No Recovery 66.9-70.0'	Installed HW casing to 65.0' Driller's Remark: 65.5-67.0' very soft (silt lense) Driller's Remark: 68.0-68.5' very soft (silt lense) R1: 10 minutes			
			3						
			NR						
70	70.0	0	>10	70.0-70.6' - Fracture zone	Limestone 70.0-70.6' - light olive gray, (5Y 5/2), strong HCl reaction, medium strong (R3), voids (1/16") over 5% of surface, trace spherical casts/cavities (3/8"), partial infill with material similar to 65.4-66.9', trace thread-like black (organic) inclusions at 70.5' No Recovery 70.6-75.0'	Driller's Remark: Approximately 3.0' of R2-NQ lodged in core barrel, driller removing string of NQ rod to retrieve sample (14:38) Driller's Remark: unable to retrieve sample from core barrel R2: 6 minutes			
-28.0			NR						
75	75.0	51	>10	75.0-75.4' - Fracture zone 75.8-76.0, 76.0-76.2' - Fractures (2), 60 deg, smooth, undulating, tight 76.6-76.7' - Fracture, 45 deg, smooth, undulating, tight 77.5' - Mechanical break 77.7' - Fracture, horizontal, rough, undulating, open 77.85-78.05' - Fracture zone 78.05-78.8' - Fracture, vertical, smooth, undulating, open 1/8" 78.8' - Fracture, <5 deg, rough, undulating, open 3/8" 80.1' - Fracture, no discerning orientation	Limestone 75.0-79.2' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2), 77.95-78.05' is extremely weak to very weak (R0 to R1), voids (up to 1/8") over 20% of surface, trace cavities, large cavity (1-9/16"x1-3/16") partially infilled with soft (R0) carbonate at 77.2' No Recovery 79.2-80.0'	Driller's Remark: medium to hard 17:00 stop due to lightning 17:30 shut down for day 6/14/07 water level at 25.0' R3: 6 minutes			
-33.0			>10						
			>10						
			2						
			0						
			NR						
80	80.0	67	1	81.25' - Fracture, 30 deg, rough, undulating, open 81.5' - Mechanical break 81.5-82.4' - Fracture or mechanical break, vertical and terminating at 60 deg, rough, undulating, tight 82.5' - Mechanical break 82.9-83.1' - Fracture zone 83.35-83.5' - Fracture zone 83.8-84.0' - Fracture zone	Limestone 80.0-84.7' - Same as 75.0-79.2' except moderate HCl reaction, extremely weak to weak (R0 to R1) at 82.9-83.5', trace casts/cavities (up to 3/4"x9/16")	Driller's Remark: "stiff" run except soft at last 2.0' R4: 5 minutes			
			2						
			1						
			>10						
			0						
-38.0		NR							
85	85.0		NR		No Recovery 84.7-85.0				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-43.0	R5-NQ 5 ft 78%	41	>10	85.0-85.5' - Fracture zone 85.7' - Fracture, horizontal, rough, undulating, open		Limestone 85.0-86.35' - Same as 75.0-79.2' except cavities (1-3/16"x3/8") at 86.3' over 50% of surface 86.35-87.65' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), trace voids (up to 1/16"), trace cavities (5/16"x1/16") Fat Clay (CH) 87.65-87.8' Limestone 87.8-88.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), <2% casts (up to 1/4"x1/4") No Recovery 88.9-90.0' 90.0-91.9' - yellowish gray, (5Y 7/2), fine to medium grained, very strong HCl reaction, very weak (R1), voids (up to 3/16") over 15-20% of surface, trace spherical casts and cavities (up to 3/8") No Recovery 91.9-95.0'	SC-1 collected at 86.35-87.4' Driller's Remark: 87.0-87.5' soft R5: 6 minutes
1			86.2-86.3' - Fracture, 30 deg, rough, undulating, open				
2			87.35-87.55' - Fracture, 60 deg, smooth, stepped, tight				
3			88.25-88.35' - Fracture, 30 deg, rough, undulating, open 88.35-88.9' - Fracture, vertical, smooth, undulating, tight				
NR			88.7' - Fracture, horizontal, rough, undulating, tight				
90 -48.0	R6-NQ 5 ft 38%	25	>10	90.0-90.2' - Fracture zone 90.5-90.95' - Fracture zone		Driller's Remark: 89.0-90.0' soft SC-2 collected at 90.9-91.8' R6: 3 minutes	
1			91.8' - Fracture, horizontal, rough, undulating, open				
NR							
95 -53.0	R7-NQ 5 ft 100%	61	3	95.4' - Bedding plane, horizontal, smooth, planar, tight		Limestone 95.0-100.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR 6/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids (up to 3/16") over 15-20% of surface, no visible cavities except 98.0-98.6' 10% casts/cavities (up to 1"x3/8"), poorly fossiliferous, black (organic) laminae at 97.9'	R7: 5 minutes
4			95.65-95.8' - Fracture, 30 deg, smooth, undulating, open				
>10			96.05' - Fractures (2), <30 deg, smooth, undulating, open 96.4' - Fracture, 25 deg, smooth, stepped, tight				
1			96.6-96.7' - Fractures (2), horizontal, smooth, undulating, open				
1			97.0-97.7' - Fracture zone (8), 0-30 deg, rough, undulating, open 98.35, 98.45' - Fractures (2), <10 deg, rough, undulating, tight				
100 -58.0	R8-NQ 5 ft 68%	26	>10	99.55' - Bedding plane, horizontal, rough, undulating, tight		100.0-100.55' - Same as 95.0-100.0' 100.55-103.4' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), no visible casts/cavities No Recovery 103.4-105.0'	R8: 4 minutes
2			100.2, 100.4' - Fractures (2), horizontal, smooth, undulating, open				
5			100.55, 100.9' 101.4, 101.85, 102.35, 102.55, 102.7, 102.9' - Fractures (6), horizontal, smooth, undulating, open				
2			102.95-103.15' - Fracture zone, black staining over 75% of surface				
NR							
105 105.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 7 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 bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-63.0	R9-NQ 5 ft 50%	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, strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), no visible casts/cavities No Recovery 107.5-110.0'	R9: 3 minutes	
			>10	106.15-106.4' - Fracture zone			
			5	106.5, 106.7, 106.95, 107.0, 107.05, 107.3, 107.4' - Bedding plane (7), horizontal, smooth, planar to undulating, open			
			NR				
110	110.0						
-68.0	R10-NQ 5 ft 74%	12	NA	111.65, 111.95' - Fractures (2), <10 deg, rough, undulating, open (small rock fragments associated with fracture) 112.5' - Mechanical break 112.8-113.3' - Fracture zone, possibly due to casts/cavities	Carbonate Silts And Sands (SP-SM) 110.0-111.4' - yellowish gray to light 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 sand-sized particles and 20% silt-sized Limestone 111.4-113.7' - very pale orange, (10YR 8/2), fine to medium grained, extremely weak to weak (R0 to R2), 111.4-112.0' no visible voids or cavities, at 112.0-113.7' voids (up to 3/16") over 15-20% of surface, 10% casts/cavities (up to 9/16"x3/4") No Recovery 113.7-115.0' Limestone 115.0-116.8' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), medium to coarse grained, strong 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 fossiliferous No Recovery 116.8-120.0'	Unclear if material is cuttings or very poorly indurated rock that was destroyed by drilling action R10: 3 minutes	
			NA				
			>10				
			>10				
		NR					
115	115.0						
-73.0	R11-NQ 5 ft 36%	11	>10	115.0-115.2' - Fracture zone	No Recovery 113.7-115.0' Limestone 115.0-116.8' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), medium to coarse grained, strong 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 fossiliferous No Recovery 116.8-120.0'	Driller's Remark: 116.5-120.0' very soft R11: 3 minutes	
			1	115.2-115.4' - Bedding plane (3), horizontal, smooth, planar, open			
			NR	115.55, 115.75, 115.95' - Fractures (3), horizontal, rough, undulating, open 116.55' - Fracture, <10 deg, rough, undulating, open			
120	120.0						
-78.0	R12-NQ 5 ft 0%	0			No Recovery 120.0-125.0'	Driller's Remark: no recovery 6/14/07 R12: 2 minutes	
			NR				
125	125.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 8 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 bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-83.0	R13-NQ 5 ft 18%	0	>10		Limestone 125.0-125.35' - Same as 115.0-116.8' 125.35-125.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), trace voids (up to 1/16"), no visible cavities 125.6-125.9' - Same as 115.0-116.8' No Recovery 125.9-130.0'	Driller's Remark: very soft to 128.5' R13: 4 minutes	
130 -88.0	R14-NQ 5 ft 56%	0	NA		Carbonate Silts And Sands (SM) 130.0-131.6' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), loose, strong HCl reaction, fine to medium grained sands Limestone 131.6-132.8' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak to weak (R0 to R2), voids (up to 1/16") over 5-10% of surface and increasing with depth, no visible casts except 133.55-133.8' 20-30% casts (up to 1-3/4"x1") No Recovery 132.8-135.0'	possible alluvial/fluvial deposit R14: 5 minutes	
135 -93.0	R15-NQ 5 ft 52%	10	>10		Carbonate Silts And Sands (SM) 135.0-136.35' - Same as 130.0-131.6' Limestone 136.35-137.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), no visible voids or cavities except 10% voids at 137.4' and 137.6' No Recovery 137.6-140.0'	Possible cuttings or infill R15: 26 minutes	
140 -98.0	R16-NQ 5 ft 58%	0	NA		Carbonate Silts And Sands (SM) 140.0-141.5' - Same as 130.0-131.6' except grades from 60% fines to fine sand at top to 80% medium sand and 20% fines at bottom Limestone 141.5-142.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), trace voids (up to 1/16"), no visible cavities No Recovery 142.9-145.0'	Possible cuttings or infill R16: 4 minutes	
145							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-04A	SHEET 9 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 bgs on 6/14/07 START : 6/12/2007 END : 6/13/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-103.0	R17-NQ 5.2 ft 100%	51	0		<p>145.0-146.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), trace voids (up to 1/16"), trace casts and cavities (up to 1/8"x3/16")</p> <p>146.5-147.2' - Same as 145.0-146.5' except voids (1/16") over 10-15% of surface</p> <p>147.2-150.15' - pale yellowish brown to very pale orange, (10YR 6/2 to 10YR 8/2), fine grained, strong HCl reaction, very weak (R1), thin alternating bands of pale yellowish brown to very pale orange (10YR 6/2 to 10YR 8/2) from 147.7-148.45', extremely weak (R0) rock from 147.6-147.8', voids (up to 1/16") over 5-15% of surface and decreasing with depth, trace casts/cavities (up to 3/8"x3/16")</p> <p>Bottom of Boring at 150.2 ft bgs on 6/13/2007</p>	<p>SC-3 collected at 145.0-145.95'</p> <p>R17: 4 minutes</p> <p>Total depth of boring 150.15' below ground surface at 14:10</p> <p>First batch grout: 32 gallons water, 6 47-lb bags of Portland cement up to approximately 100.0' below ground surface</p> <p>Second batch grout: 32 gallons water, 6 47-lb bags of Portland cement up to approximately 40.0' below ground surface - pull casing up to 25.0' below ground surface</p> <p>Third batch of grout: 32 gallons water, 5 47-lb bags of Portland cement up to ground surface</p> <p>Total grout: 96 gallons of water, 17 47-lb bags of Portland cement</p>	
			2	145.95' - Mechanical break			
			3	146.5, 146.75, 147.2, 147.85, 147.95' - Fractures (5), horizontal, rough, undulating, open			
			3	147.6-147.8' - Mechanical break, extremely weak section			
			3	147.85-148.15' - Fracture, vertical, rough, undulating, open			
150	150.2		3	148.15, 148.5' - Fractures (2), horizontal, rough, undulating, open			
-108.0				149.05' - Bedding plane, smooth, planar to undulating, open			
				149.8' - Bedding plane, smooth, planar to undulating, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-05	SHEET 1 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
 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 : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.9	0.0	1.5	SS-1	1-2-1 (3)	Poorly Graded Sand (SP) 0.0-1.0' - light gray, (N7), dry to moist, very loose, very fine silica sand, trace nonplastic fines, trace very fine grained black particles, roots Silty Sand With Organics (SM) 1.0-1.5' - dusky yellowish brown grading to dark yellowish brown, (10YR 2/2 to 10YR 4/2), moist, very loose, very fine to fine grained, silica sand, 15-20% nonplastic organic fines		
5 37.9	5.0	6.5	SS-2	5-6-4 (10)	Poorly Graded Sand With Silt (SP-SM) 5.0-6.1' - white with dark yellowish orange and pale yellowish brown staining, (N9, with 10YR 6/6 and 10YR 6/2), wet, loose, very fine to fine grained, silica sand, 5% nonplastic fines, trace angular black coarse sand-sized material (pyrite), trace roots		
10 32.9	10.0	11.5	SS-3	3-3-3 (6)	Silty Sand (SM) 10.0-11.3' - pale yellowish brown, (10YR 6/2), wet, loose, very fine to fine grained, silica sand, 30% nonplastic fines, trace very fine sand-sized black particles		
15 27.9	15.0	16.5	SS-4	3-2-2 (4)	Silty Sand (SM) 15.0-16.1' - Same as 10.0-11.3' except very loose		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-05	SHEET 2 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
 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 : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.9	20.0	1.4	SS-5	2-3-4 (7)	Sandy Fat Clay (CH) 20.0-21.4' - light greenish gray, (5GY 8/1), wet, stiff, high plasticity, no dilatancy, no HCl reaction, heavily mottled with dark yellowish orange (10YR 6/6), 30% white very fine silica sand, 5-10% very fine sand-sized black particles, scattered pockets of medium sand-sized white particles throughout, up to 1/8" in size		
	21.5						
25	25.0	0.7	SS-6	5-6-5 (11)	Silty Sand (SM) 25.0-25.7' - yellowish gray, (5Y 7/2), wet, loose, very fine to fine grained, silica sand, 15-20% nonplastic fines, trace very fine sand-sized black particles		
17.9	26.5						
30	30.0	1.0	SS-7	1-3-3 (6)	Silty Gravel With Sand (GM) 30.0-30.95' - yellowish gray, (5Y 8/1), wet, stiff, low to medium plasticity, rapid dilatancy, no HCl reaction, gray staining and laminated appearance, 50% of sample is fine to coarse gravel-sized material, trace organics, limestone appearance, also has appearance of fine grained conglomerate		
12.9	31.5						
35	35.0	1.2	SS-8	4-6-5 (11)	Sand With Silt (SP-SM) 35.0-36.15' - yellowish gray, (5Y 7/2), wet, medium dense, very fine to fine grained, no HCl reaction, silica sand, with trace medium dark gray (N4) mottling, 10% nonplastic fines		
7.9	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
2.9	40.0	1.5	SS-9	1-2-2 (4)	Elastic Silt And Fat Clay (CH) 40.0-41.5' - grayish olive green, (5GY 3/2), wet, soft, high plasticity, no dilatancy, materials are layered in an irregular way giving a mottled appearance, predominantly clay, mottled with another clay and silt, clay is olive gray (5Y 3/2), high plastic, no dilatancy, no HCl reaction, silt is yellowish gray (5Y 8/1), low to medium plastic, rapid dilatancy, very mild HCl reaction		Driller's Remark: Loss of circulation after pulling up SPT sampler
	41.5						
45 -2.1	45.0	1.3	SS-10	3-5-5 (10)	Poorly Graded Sand With Silt (SP-SM) 45.0-46.3' - pale yellowish brown with medium dark gray staining, (10YR 6/2 with N4 staining), wet, loose, very fine to fine grained, no HCl reaction, silica sand, 10-15% nonplastic fines, 1/2" lens of grayish olive green (5G 3/2) fat clay (CH), trace very fine to coarse sand-sized pyrite fragments		
	46.5						
50 -7.1	50.0	1.5	SS-11	1-2-3 (5)	Sandy Lean Clay (CL) 50.0-51.5' - greenish gray and grayish olive green, (5GY 6/1 and 5GY 3/2), wet, stiff, high plasticity, no dilatancy, no HCl reaction, 40% very fine to fine silica sand, seams and pockets of other materials scattered throughout less than 10% of sample, yellowish gray (5Y 7/2) sandy seam, pocket of medium sand-sized white particles, pockets of silty material		
	51.5						
55 -12.1	55.0	1.5	SS-12	1-1-2 (3)	Poorly Graded Sand With Clay (SP-SC) 55.0-56.5' - greenish gray and grayish olive green, (5GY 6/1 and 5GY 3/2), wet, stiff, no to mild HCl reaction, no white particles, lenses of grayish green (5G 5/2) fat clay (CH) similar to 40.0-41.5' materials, possible organic lens, lenses of other materials are 10% of sample, sample has mottled appearance		
	56.5						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-05	SHEET 4 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
 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 : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.1	60.0	1.5	SS-13	0-1-2 (3)	[Symbolic Log Pattern]	
	61.5					
65	65.0	1.5	SS-14	2-1-3 (4)	[Symbolic Log Pattern]	
-22.1	66.5					
70	70.0	0.0	SS-15	50/1 (50/1")	[Symbolic Log Pattern]	18:42 Water level 5.0' below ground surface, last SPT on 5/7/07 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
-27.1						
75	75.0	0.3	SS-16	50/3.25 (50/3.25")	[Symbolic Log Pattern]	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
-32.1	75.3					
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
-37.1	80.0	SS-17	6"-6"-6" (N) 50/2 (50/2")	Limestone Fragments 80.0-80.1' - greenish gray, (5GY 6/1), moderate HCl reaction, 15% voids/casts on surface, very poor recovery Begin Rock Coring at 81.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Advanced 4" HW casing to 78.6' below ground surface, switch to NQ wireline coring assembly
-42.1						
-47.1						
-52.1						
100						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-05	SHEET 6 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 : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
81.0	R1-NQ 5 ft 100%	90	1	81.7' - Bedding plane, rough, undulating, organic material (brownish black) covering 80% surface, open 5/8"	[Symbolic Log]	Limestone 81.0-85.3' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), spheroidal voids up to 25% surface (<1/16") in size, moderately fossiliferous (casts, molds, up to 3/8"), trace irregularly shaped cavities 25% infilled with very fine grain yellowish gray (5Y 7/2) material, trace to 7% organics, brownish black (5YR 2/1) lamination at 81.7', 83.6' and 84.2' and short (1" long), discontinuous lamination 85.3-86.0' - Same as 81.0-85.3' except yellowish gray, (5Y 8/1), strong HCl reaction, medium strong to strong (R3 to R4), 5-10% voids (<1/16"), very fine grain interval 86.0-87.1' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, medium strong (R3), trace voids (1/16"), organics rich carbonate silt bed (1/4" thick) 87.1-88.1' - Same as 86.0-87.1' except very weak (R1), moderately fossiliferous (casts, shells, molds), 10-15% fine to medium grained sized medium dark gray (N4) particles in rock matrix, 20-25% elongated and spherical shaped void/casts (<1/16), yellowish gray discoloration on 30-40% of material No Recovery 88.1-91.0' Limestone 91.0-95.9' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts, molds) fossils up to 1/2" in size, voids (<1/16") up to 25% surface, trace micro (<1/16" thick) lamination - brownish black in color - from 91.0-92.0' and 93.5-99.0', trace spherical cavities up to 3/8" partially filled with black very soft fine material (organics), medium gray (N5) fine grain particles in rock matrix, powder/chalk like texture to rock No Recovery 95.9-96.0' Limestone 96.0-104.0' - Same as 91.0- 95.9' except large 1-1/4" cavity at 96.6', 80% filled with carbonate silt, light olive gray (5Y 6/1) from 96.2-96.8' and 97.3-98.7', organics also appears up to 1" long <1/32" thick laminations at 96.3' and 97.3'	First core run on 5/8/07	
85 -42.1			2	82.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1"			R1: 9 minutes	
86.0			1	82.6' - Fracture, 80 deg, rough, undulating, tight			Driller's Remark: 86.5' <5% circulation loss, regained at 87'	
			3	83.6' - Bedding plane, horizontal, rough, undulating, tight				
90 -47.1			R2-NQ 5 ft 42%	30			0	84.3' - Fracture, 25 deg, rough, undulating, fossil casts/molds on fracture surface
	2	84.8' - Bedding plane, horizontal, rough, undulating, 1" thick, tight			R3: 4 minutes			
	2	84.9' - Fracture, vertical, rough, undulating, grayish, staining 10% surface, tight						
	0	85.3' - Mechanical break						
	0	86.1' - Mechanical break						
95 -52.1	R3-NQ 5 ft 98%	98	0	86.3' - Fracture, 80-90 deg, rough, undulating, gray staining over 15-20% surface, tight	[Symbolic Log]	86.0-87.1' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, medium strong (R3), trace voids (1/16"), organics rich carbonate silt bed (1/4" thick) 87.1-88.1' - Same as 86.0-87.1' except very weak (R1), moderately fossiliferous (casts, shells, molds), 10-15% fine to medium grained sized medium dark gray (N4) particles in rock matrix, 20-25% elongated and spherical shaped void/casts (<1/16), yellowish gray discoloration on 30-40% of material No Recovery 88.1-91.0' Limestone 91.0-95.9' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts, molds) fossils up to 1/2" in size, voids (<1/16") up to 25% surface, trace micro (<1/16" thick) lamination - brownish black in color - from 91.0-92.0' and 93.5-99.0', trace spherical cavities up to 3/8" partially filled with black very soft fine material (organics), medium gray (N5) fine grain particles in rock matrix, powder/chalk like texture to rock No Recovery 95.9-96.0' Limestone 96.0-104.0' - Same as 91.0- 95.9' except large 1-1/4" cavity at 96.6', 80% filled with carbonate silt, light olive gray (5Y 6/1) from 96.2-96.8' and 97.3-98.7', organics also appears up to 1" long <1/32" thick laminations at 96.3' and 97.3'	R4: 6 minutes	
			0	86.85' - Bedding plane, horizontal, smooth, planar, 1/4" carbonate silt infill, tight				
			1	87.1' - Bedding plane, horizontal, rough, undulating, open 1"				
			0	87.75' - Fracture, 10-15 deg, rough, undulating, tight				
			0	93.1' - Fracture or mechanical break, 20 deg, rough, undulating, tight				
100 -57.1	R4-NQ 5 ft 100%	90	0	93.5' - Mechanical break	[Symbolic Log]	86.0-87.1' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, medium strong (R3), trace voids (1/16"), organics rich carbonate silt bed (1/4" thick) 87.1-88.1' - Same as 86.0-87.1' except very weak (R1), moderately fossiliferous (casts, shells, molds), 10-15% fine to medium grained sized medium dark gray (N4) particles in rock matrix, 20-25% elongated and spherical shaped void/casts (<1/16), yellowish gray discoloration on 30-40% of material No Recovery 88.1-91.0' Limestone 91.0-95.9' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts, molds) fossils up to 1/2" in size, voids (<1/16") up to 25% surface, trace micro (<1/16" thick) lamination - brownish black in color - from 91.0-92.0' and 93.5-99.0', trace spherical cavities up to 3/8" partially filled with black very soft fine material (organics), medium gray (N5) fine grain particles in rock matrix, powder/chalk like texture to rock No Recovery 95.9-96.0' Limestone 96.0-104.0' - Same as 91.0- 95.9' except large 1-1/4" cavity at 96.6', 80% filled with carbonate silt, light olive gray (5Y 6/1) from 96.2-96.8' and 97.3-98.7', organics also appears up to 1" long <1/32" thick laminations at 96.3' and 97.3'	SC1-collected at 98.5-99.6'	
			0	96.2' - Mechanical break, horizontal, rough, undulating, open 1/2"				
			2	97.65' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
			1	97.8' - Bedding plane or mechanical break, horizontal, rough, undulating, brownish black (organic) covering <50-60% surface, open 1/16"				
			1	98.0' - Fracture or mechanical break, horizontal, rough, undulating, tight				
101.0			1	98.5' - Mechanical break				



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
 WATER LEVELS : 4.0 ft bgs on 5/8/07 START : 5/7/2007 END : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
105 -62.1	R5-NQ 5 ft 80%	36	0	99.6' - Fracture, 10-15 deg, rough, undulating, tight		Limestone 101.0-105.0' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), over all powder/chalk-like feel, 15-20% voids/casts, highly fossiliferous (forams and foram casts), 10% fine grain medium dark gray, (N4) particles (probably pyrite), yellowish gray (5Y 7/8) staining from 101.0-103.0', voids tend to be concentrated in a horizontal orientation No Recovery 105.0-106.0'	R5: 8 minutes	
			2	101.2' - Mechanical break, horizontal, rough, planar, <1/16 gap				
			>10	102.2' - Fracture, 45 deg, rough, undulating, tight				
			8	102.6' - Mechanical break or bedding plane, rough, undulating, open up to 1/2"				
110 -67.1	R6-NQ 5 ft 90%	56	>10	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, 104.7' - Bedding plane or mechanical break (18), smooth and planar to smooth and undulating, open 1/16"		Limestone 106.0-107.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), stained light gray (N7) over 40% of entire sample, highly fossiliferous (forams and foram casts, echinoderms), 20-25% fine grained pyrite in rock matrix, gradational with 107.0-110.5' 107.0-110.5' - Same as 106.0-107.0' except fine grained, molds and casts up to 1/32"-3/8" No Recovery 110.5-111.0'	R6: 5 minutes	
			2	106.1' - Mechanical break, horizontal, rough, undulating, open 1/8"				
			2	106.3-106.45' - Fracture zone, 1"-1-3/8" sized rock fragments				
			2	106.5' - Fracture, 80 deg, smooth, planar, <1/22" organics on surface, tight				
115 -72.1	R7-NQ 5 ft 88%	79	1	106.9' - Fracture, 50 deg, rough, undulating, tight		Limestone 110.0-115.4' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, weak (R2), becoming mottled moderate yellow (5Y 7/6) with depth, voids rare to absent except from 115.0-115.4' where voids <1/16" cover 1-3% of rock surface, cavities rare (3/16" in diameter), rare echinoderms, fossil voids/casts rare to absent, thick bedded except from 115.3-115.4' which is laminated, fine grained (sharp contact with overlying massive bedded limestone) No Recovery 115.4-116.0'	SC-2 collected at 112.5-113.6'	
			1	107.4' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			2	107.8' - Fracture, 50-60 deg, rough, undulating, tight				
			0	108.3' - Fracture or bedding plane, 15-20 deg, rough, undulating, open 1/8"				
120 -77.1	R8-NQ 5 ft 90%	76	3	108.65-108.8' - Fracture zone		Limestone 116.0-120.5' - yellowish gray, (5Y 7/2), medium to coarse grained, very weak to weak (R1 to R2), except from 116.1-116.15' which is very fine grained and medium strong rock (R3), voids (<1/16") over 5% or less of rock surface, some cavities up to 3/16" over 1-2% of rock surface to 120.4', fossils (molds/casts) rare to absent, rare echinoderms, some lithoclast (1"-1-1/2" long) from 120.0-120.5', cavities common from 120.4-120.5'	R7: 4 minutes	
			2	109.1' - Fracture, 10-15 deg, rough, undulating, tight				
			2	109.4' - Fracture, 80-90 deg, rough, undulating, open 1/2"				
			2	110.1' - Fracture, 60-65 deg, rough, undulating, tight				
			0	110.0-111.25' - Fracture zone		R8: 7 minutes		
			2	111.35' - Mechanical break, 50 deg, rough, undulating, tight				
			2	111.75' - Fracture, 50 deg, rough, undulating, tight				
			0	112.5' - Fracture or mechanical break, 5-10 deg, rough, undulating, tight				
			NR	113.6' - Fracture, 50 deg, rough, undulating, tight				
			NR	114.4' - Fracture, 0-5 deg, rough, undulating, tight				
			3	114.8, 114.9' - Mechanical break or fractures (2), horizontal, rough, planar				
			2	115.0' - Mechanical break, 30 deg, rough, undulating				
			2	116.1' - Bedding plane, 0-5 deg, rough, undulating, open 1/8", fine infilling				
			2	116.25-116.35' - Fracture zone				
			2	116.7' - Fracture or mechanical break, horizontal, rough, planar, 1/8" open				
			0	117.2' - Fracture, 20-25 deg, rough, undulating, open up to 1/8"				
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)

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 : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -82.1	R9-NQ 5 ft 100%	77	3	117.5' - Fracture or mechanical break, horizontal, rough, undulating, tight to 1/2" open		No Recovery 120.5-121.0' Limestone 121.0-123.4' - yellowish gray, (5Y 8/1), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 5-10% of rock surface, cavities common (up to 3/8"-3/4"), fossiliferous (echinoderms) and casts/molds, some areas where rock is fine-grained and stronger (R2-R3), some rip-up clasts/intraclasts especially at 121.3-121.5' 123.4-126.0' - yellowish gray, (5Y 8/1), very fine to fine grained, alternating beds several inches thick, voids (<1/16") over 1-3% of rock surface, some cavities up to 3/4" (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 reaction, very weak (R1), voids (<1/16") over 5% or less of rock surface, cavities rare to absent (<3/16" in diameter), fossil molds/casts rare, some laminations 128.5-130.6' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, voids (<1/16") over 3-5% of rock surface, some cavities up to 3/8"-3/4" in diameter (typically elongated), fossiliferous (molds/casts and rare echinoids), very rare (<1/16") dark gray argillaceous grains No Recovery 130.6-131.0' Limestone 131.0-132.6' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), powder/chalk-like feel, highly fossiliferous (forams), voids/casts (<1/16") over 10-15% of surface, 15-20% cavities infilled with medium light gray (N6) fine grained mineral with strong HCl reaction, cavities are irregularly shaped to spherical and range in size from 3/16"- 1-3/8", horizontal aligned fossil (casts/shells) and gray cavities, bedding/discontinuity at 131.65'	Water level 10.8' below ground surface in outer (4"HW) casing, 3.8' below ground surface in borehole (uncased) R9: Runtime not recorded R10: Runtime not recorded First core run on 5/9/07, water level at 4.1' below ground surface Driller's Remark: NQ core barrel has snapped in two pieces SC-3 collected at 131.85-132.6' R11: 23 minutes R12: 15 minutes	
			1	118.65' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			4	118.85' - Fracture, 20-25 deg, rough, undulating, tight				
			2	119.45' - Fracture, 35-40 deg, rough, undulating, tight				
			0	119.95' - Fracture, 20 deg, rough, undulating, tight				
			>10	120.35' - Mechanical break				
			2	121.1, 121.3, 121.5, 121.6' - Bedding plane or mechanical break (4), horizontal, rough, undulating, open 1/8"				
			1	122.5' - Fracture, 40 deg, rough, undulating, tight				
			2	123.4' - Fracture, 5-10 deg, rough, undulating, open <1/16"				
			1	123.55, 123.75, 123.95' - Bedding plane or mechanical break (3), horizontal, rough, planar, tight				
130 -87.1	R10-NQ 5 ft 92%	52	1	124.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
			2	124.95' - Bedding plane or mechanical break, horizontal, smooth, planar, tight				
			1	125.9' - Mechanical break, 50 deg, rough, undulating				
			NR	126.0-127.0' - Mechanical break, horizontal, smooth, planar, multiple breaks along bedding planes, tight				
			3	127.55' - Fracture or mechanical break, 0-5 deg, rough, planar, tight				
			>10	128.5' - Bedding plane, horizontal, rough, undulating, tight				
			>10	129.2' - Fracture or mechanical break, horizontal, open up to 1"				
			NR	129.7' - Bedding plane or mechanical break, horizontal, rough, planar, tight to 1/4" gap				
135 -92.1	R11-NQ 5 ft 50%	23	NR	130.15' - Fracture, 70-75 deg, rough, undulating, tight				
			3	131.15, 131.4' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight to open 1/16"				
			3	131.85' - Bedding plane, horizontal, rough, undulating, tight, 3/4" sized exposed medium light gray (N6) filled voids on surface				
			3	132.6' - Fracture zone, angular fragments of rock				
			0	136.1, 136.05' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/8" open				
			1	136.3' - Fracture, 60 deg, rough, undulating, tight				
			0	137.1' - Fracture, 45 deg, rough, undulating, centimeter spaced parallel fracture				
140 -97.1	R12-NQ 5 ft 84%	66	1	137.3' - Bedding plane, horizontal, rough, undulating, light olive gray hard mineralization over 38% surface, 1/32" thick, tight				
			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-05	SHEET 9 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 : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.1	R13-NQ 5 ft 94%	50	3	137.35' - Mechanical break, 40-50 deg, rough, planar, tight 137.65' - Bedding plane or mechanical break, horizontal, rough, undulating, exposed molds on surface, open 5/8" 138.5' - Mechanical break 139.25' - Fracture, 40 deg, rough, undulating, tight 140.1' - Mechanical break, horizontal, rough, undulating, tight 141.25' - Mechanical break or bedding plane, horizontal, rough, planar, tight 141.65' - Fracture, vertical, rough, undulating, brown staining over surface (100%), <1/32" infill over 98% surface 141.75' - Fracture or mechanical break, horizontal, rough, undulating, tight 142.5' - Fracture or mechanical break, horizontal, rough, undulating, tight 143.3' - Fractures or mechanical break (2), 5-10 deg, rough, undulating, tight 143.85' - Fracture or mechanical break, 0-5 deg, rough, undulating, tight 144.45' - Fracture or mechanical break, horizontal, rough, undulating, tight 144.6' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" open 144.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16" open 144.9, 144.95' - Mechanical break (2), rough, undulating, open <1/16"		Limestone 132.6-133.5' - medium light gray to medium gray, (N6 to N5), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), trace voids/casts (<1/16"), poorly fossiliferous (1" molds), very fine grain pyrite grains in rock matrix (5-7%), 10-15% cavities from 1/8" to 1" in size, oval in shape unfilled to partially filled with a yellowish gray (5Y 7/2) very fine grained material that is 40-45% voids <1/16" No Recovery 133.5-136.0' Limestone 136.0-137.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), strong HCl reaction, medium strong to strong (R3 to R4), thin bedded alternating with very fine grained rock with medium grain-sized particles in the laminated (<1/16") beds 137.5-140.2' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), 7-10% coarse grain-sized flat angular fossil fragments horizontally aligned, 15-25% medium to coarse grain-sized medium dark gray (N4), subrounded particles also horizontally aligned, highly fossiliferous, trace voids (<3/16"), sharp discontinuity at 139.5' No Recovery 140.2-141.0' Limestone 141.0-142.6' - yellowish gray, (5Y 8/1), very fine to medium grained, strong HCl reaction, very weak (R1), texture coarsening with depth to sharp contact at 142.6', interval of moderate yellow brown and light brown (5Y 7/6 and 5Y 5/6) fine to medium grained rounded grains, powder to chalk-like texture 142.6-145.0' - Same as 141.0-142.6' except light olive gray, (5Y 5/2), moderate to strong HCl reaction, medium strong (R3), voids 10-15% (<1/16") spheroidal trace elongated cavities 3/16"x1/16" 145.0-145.7' - Same as 141.0-142.6' except yellowish gray, (5Y 8/1), very weak to weak (R1 to R2), 25-30% olive black (5Y 2/1) laminations No Recovery 145.7-146.0' Limestone 146.0-146.5' - Same as 145.0-145.7'	R13: 11 minutes
150 -107.1	R14-NQ 5 ft 96%	60	3	145.1, 145.35' - Bedding plane (2), 0-5 deg, rough, undulating, wavy bed of organics, 100% surface coverage with brownish black organics 146.5' - Bedding plane, 15-20 deg, rough, undulating 146.6' - Fracture, 50 deg, rough, undulating, tight 146.8' - Fracture, 70 deg, rough, undulating, black stains over 100% surface, tight 147.0' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 147.3' - Bedding plane or mechanical break, 0-5 deg, rough, planar, tight 147.5' - Fracture, 60 deg, rough, undulating, black staining 80-90% surface, tight 147.8' - Fracture, 15-20 deg, rough, undulating, tight 148.7' - Fracture or mechanical break, horizontal, rough, undulating, tight 149.25' - Fracture, 40 deg, rough, undulating, tight to 1/8" open 149.45' - Fracture, 10-15 deg, rough, planar, tight 150.3' - Fracture or mechanical break, horizontal, rough, undulating, hard mineral infill covering 30-40% surface 1/16" thick, open 1/8" 150.6' - Fracture or mechanical break, horizontal, smooth, planar, open 1/16"		SC-4 collected at 147.8-148.7'	
151.0		NR				R14: 8 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 5/9/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					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		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-06	SHEET 1 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
 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 : 4.4 ft bgs on 4/26/07 START : 4/24/2007 END : 4/26/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
42.5	0.0	1.0	SS-1	0-1-2 (3)	Topsoil 0.0-0.2' Poorly Graded Sand (SP) 0.2-1.0' - light brownish gray, (5YR 6/1), moist, very loose, very fine to fine grained, silica sand with medium dark gray (N4) mottling, trace of nonplastic fines, roots and organics decreasing with depth		16:51 Begin drilling, sample SS-1 taken; first 6"=weight of hammer
	1.5						
5 37.5	5.0	1.1	SS-2	4-4-4 (8)	Clayey Sand (SC) 5.0-6.1' - greenish gray, (5G 6/1), moist to wet, loose, very fine to fine grained, no HCl reaction, silica sand, 20% low plasticity fines, trace very fine sand-sized black particles		4/25/07, 07:38 Begin drilling to 5' using tricone bit 07:40: SS-2 taken
	6.5						
10 32.5	10.0	1.3	SS-3	3-3-4 (7)	Silty Sand (SM) 10.0-11.25' - light olive gray to greenish gray, (5Y 6/1 to 5GY 6/1), wet, loose, very fine to fine grained, no HCl reaction, silica sand, 15% low plasticity fines, trace very fine black particles, trace organics		07:48: SS-3 taken
	11.5						
15 27.5	15.0	1.5	SS-4	4-4-4 (8)	Silty Sand (SM) 15.0-16.5' - light olive gray to light gray, (5Y 6/1 to N7), wet, loose, very fine to fine grained, no HCl reaction, silica sand, 30% low plasticity fines, trace very fine sand-sized black particles		SS-4 is less plastic than SS-3
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-06	SHEET 2 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

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 : 4.4 ft bgs on 4/26/07 START : 4/24/2007 END : 4/26/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.5	20.0	1.2	SS-5	2-5-4 (9)	Clayey Sand (SC) 20.0-21.0' - yellowish gray to light gray, (5Y 8/1 to N7), moist, loose, high plasticity, no dilatancy, no HCl reaction, 28% fines Fat Clay (CH) 21.0-21.2' - light bluish gray, (5G 7/1), moist, stiff, high plasticity, no dilatancy, no HCl reaction		
25	25.0	1.4	SS-6	1-2-2 (4)	Clayey Sand (SC) 25.0-26.4' - yellowish gray, (5Y 8/1), wet, very loose, very fine to fine grained, no HCl reaction, 25% medium plasticity fines, increasing to 40% by 26.2', silica sand		
30	30.0	1.5	SS-7	2-2-2 (4)	Silty Sand (SM) 30.0-30.8' - grayish orange, (10YR 7/4), wet, very loose, very fine to fine grained, no HCl reaction, 20% no to low plasticity fines, silica sand Organic Soil (OH) 30.8-31.5' - olive black, (5Y 2/1), wet, soft, high plasticity, no to slow dilatancy, no HCl reaction, 10-15% very fine grained silica sand, white gravel-sized fragment at 30.9', medium grained		
35	35.0	1.5	SS-8	2-3-1 (4)	Clayey Sand (SC) 35.0-36.5' - olive black with grayish orange mottling, (5Y 2/1 with 10YR 7/4), wet, very loose, very fine to fine grained, no HCl reaction, 12% low to medium plasticity fines, silica sand, some organic fines		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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 : 4.4 ft bgs on 4/26/07 START : 4/24/2007 END : 4/26/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
2.5	40.0	1.5	SS-9	2-1-2 (3)	Clayey Sand (SC) 40.0-41.5' - Same as 35.0-36.0' except no HCl reaction, 16% fines, silica sand, varies in irregular beds throughout		
	41.5						
45	45.0	1.1	SS-10	1-2-1 (3)	Silt (ML) 45.0-46.1' - black mottled with moderate yellowish brown (5Y 2/1 mottled with 10YR 5/4), wet, soft, nonplastic, no dilatancy, no HCl reaction, trace to 10% very fine to fine grained, silica sand		
-2.5	46.5						
50	50.0	1.5	SS-11	0-1-1 (2)	Fat Clay (CH) 50.0-50.45' - Same as 45.0-46.1' except pale olive mottled with light olive gray and moderate yellowish brown, (10Y 6/2 mottled with 5Y 5/2 and 10YR 5/4), 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 HCl reaction, silica sand, 20-25% low plasticity fines Fat Clay (CH) 51.3-51.5' - Same as 50.0-50.45' except interbedded fat clay (CH) with silty sand (SM)		
-7.5	51.5						
55	55.0	1.3	SS-12	34-44-50/4.5 (94/10.5")	Silt (ML) 55.0-56.3' - moderate yellowish brown, (10YR 5/4), moist, hard, low plasticity, rapid dilatancy, moderate HCl reaction, 5-10% fine to medium sand grained, trace organics, all carbonate		
-12.5	56.4						
60							09:28: Setting casing to 59' (1" stick up 60' casing)



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-06	SHEET 4 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
 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 : 4.4 ft bgs on 4/26/07 START : 4/24/2007 END : 4/26/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-17.5	60.0	0.2	SS-13	50/4 (50/4")	Silt (ML) 60.0-60.2' - Same as 55.0-56.3' except light olive brown, (5Y 5/6), moderate to strong HCl reaction		10:48 Slight chatter while drilling 11:03 Bringing up SS-13
65 -22.5	65.0 65.4	0.2	SS-14	50/4.5 (50/4.5")	Limestone Fragments 65.0-65.2' - dusky yellow, (5Y 6/4), mild HCl reaction, friable Begin Rock Coring at 65.5 ft bgs See the next sheet for the rock core log		11:22 Bringing up SS-14 11:41 Switching to core barrel
70 -27.5							
75 -32.5							
80							



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, 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
65.5	R1-NQ 1 ft 100%	0	2	65.5-65.7' - Bedding plane, horizontal, bedding change		Silt (ML) 65.5-65.7' - very fine grained, some organics Limestone 65.7-66.5' - yellowish gray, (5Y 7/2), very fine grained, no to moderate HCl reaction, weak (R2), voids up to 1/16" over 20% of surface, poorly fossiliferous, infill of yellowish gray (5Y 8/1) over < 5%, infill has voids/fossils Limestone 66.5-67.9 and 68.5-69.8' - Same as 65.7-66.5' except no silt, light olive gray (5Y 5/2) from 67.9-68.5' voids up to 1/16" over 30% of surface, fossiliferous (fossil casts up to 1"), dissolution features up to 1/8", bedding feature of grayish orange (10YR 7/4) from 67.6-67.7' is fine grained, none to trace voids, fossils infill with light olive gray material 69.8-70.7' - yellowish gray, (5Y 7/2), very fine grained, weak to medium strong (R2 to R3), trace voids up to 1/16", poorly fossiliferous, no dissolution on surface No Recovery 70.7-71.5' Limestone 71.5-72.2' - Same as 65.7-66.5' except discontinuous organic laminations over < 5% of surface up 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 1/2" width, dusky yellow (5Y 6/4) silt infill 72.6-74.9' - light olive gray to very 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 gray to very pale orange mottled with very light gray (5Y 7/2 to 10YR 8/2 mottled with N8), 73.9-74.9', 73.9-74.9' has infill of very pale orange with 20% tiny voids, matrix has trace voids up to 1/16", poorly fossiliferous 74.8-74.9' - moderate olive brown, (5Y 4/4), bedding layer with organics of olive gray (5Y 3/2) <1/16" thick	Water level at 0.0 below ground surface (at surface); tooling in hole 13:30 Coring R1-NQ	
66.5			0	65.8' - Fracture, 60 deg, rough, undulating			13:45 Coring R2-NQ	
70	R2-NQ 5 ft 84%	77	4	66.2' - Mechanical break				
70			1	67.5' - Mechanical break				
70			0	67.9, 68.0, 68.2' - Bedding plane (3), <5 deg, rough, undulating, open up to 1/8"				
70			0	68.1' - Fracture, 85 deg, rough, undulating, open, no matching end				
70			0	68.8' - Mechanical break				
70			0	69.3' - Fracture, 60 deg, smooth, undulating				
70			NR	69.8' - Mechanical break				
71.5			1	72.4' - Bedding plane, <5 deg, rough, undulating, with 0.4' of silt infill, very fine			13:59 Coring R3-NQ	
75	R3-NQ 5 ft 99%	63	0	72.2-72.6', has laminar organic layers within, up to 0.05' width		SC-1 collected at 71.5-72.2'		
75			1	73.0' - Mechanical break				
75			1	73.6' - Bedding plane, <5 deg, rough, undulating				
75			0	73.9-74.0' - Mechanical break				
75			0	74.7' - Bedding plane, <5 deg, smooth to rough, undulating				
75			NR	75.3, 75.8, 76.8' - Mechanical break (3)				
76.5			3	76.55, 76.7, 76.8' - Bedding plane (3), <5 deg, rough to smooth, undulating, <5% organics on fracture surface		14:20 Coring R4-NQ		
76.5			4	77.3' - Mechanical break				
76.5			>10	77.85, 77.75' - Fractures (2), 10 deg, rough, undulating, fracturing associated with dissolution, open up to 1/2"				
76.5			1	78.2' - Fracture, 85 deg, smooth, undulating, a fragment at 79.6' is missing				
76.5			NR	78.25' - Bedding plane, smooth to rough, undulating, intersects 78.2'				
76.5			NR	79.0' - Bedding plane, <5 deg, smooth to rough, undulating, change in lithology, open up to 1/4"				
76.5			1	79.05' - Fracture, 85 deg, rough, undulating, open up to 1/8"				
76.5			1	79.1-79.25' - Fracture zone, intersecting fractures		14:35 Begin R5-NQ		
76.5			0	79.8' - Fractures, 65-70 deg, rough, undulating, intersecting fractures				
76.5			1	80.2' - Mechanical break				
76.5			0	81.5-81.7' - Fracture zone				
76.5			1	82.7' - Mechanical break				
76.5			0	83.6' - Fracture, 10 deg, rough, undulating, fracturing associated with dissolution, open up to 1/2"		SC-2 collected at 82.7-83.7'		
76.5			0	84.0' - Mechanical break				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 4.4 ft bgs on 4/26/07 START : 4/24/2007 END : 4/26/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
90 -47.5	86.5	100	1	84.2, 85.7' - Mechanical break (2)	74.9-76.45' - yellowish gray, (5Y 7/2), 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 20% surface, highly fossiliferous, 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. 76.7-77.5' same as 77.5-77.95' 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 fine grained, trace voids up to 1/16", 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 89.4-89.6' bedding features up to 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 organic layers	15:10 Begin R6-NQ	
			NR				
	0		86.95' - Bedding plane or mechanical break, <5 deg, smooth, undulating				
	1		87.3' - Mechanical break				
	1		89.0' - Mechanical break				
	1		89.15' - Bedding plane or mechanical break, <5 deg, rough, undulating				
	1		89.7' - Mechanical break				
	0		90.4' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"				
	91.5						
	95 -52.5		R7-NQ 5 ft 95%	10			91.0, 91.7, 95.8' - Mechanical break (3)	15:28 Drill R7-NQ
3		92.2' - Fracture, 60 deg, rough, undulating					
1		92.4' - Mechanical break					
1		92.7' - Fracture, 60 deg, rough, undulating, multiple missing pieces, intersecting fractures					
1		93.0' - Fracture, 80 deg, rough, undulating					
1		93.8' - Bedding plane, <5 deg, silt infill of yellowish gray color (5Y 7/2), millimeters thick organic layers (discontinuous), thickness of infill is 93.5'-94.3'					
0		95.3' - Fracture, 60 deg, rough, undulating					
96.5							
100 -57.5	R8-NQ 5 ft 100%	2	96.65, 96.7' - Bedding plane (2), <5 deg, smooth, stepped, open up to 1/8"	16:09 Drill R8-NQ			
		0	98.05' - Mechanical break				
		1	98.9, 100.5' - Bedding plane or mechanical break (2), <5 deg, rough, undulating				
		0	99.0' - Mechanical break				
		0	99.9' - Mechanical break				
		1	100.6' - Mechanical break				
101.5							
105 -62.5	R9-NQ 5 ft 100%	1	101.6' - Bedding plane, <5 deg, smooth, undulating	16:10 Begin R9-NQ			
		2	102.5' - Fracture, 70 deg, smooth, undulating				
		0	102.55' - Mechanical break				
		1	103.35' - Bedding plane, 15 deg, smooth, undulating				
			1	104.0' - Mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-06	SHEET 7 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -67.5	R10-NQ 5 ft 96%	85	1	104.9' - Bedding plane, <20 deg, rough, undulating, open up to 1/4" 105.6' - Fracture, 70 deg, smooth, undulating, intersecting high angle fractures	91.7-93.5' - very fine grained, trace voids to 1/16", trace fossils up to 1/4", voids increasing with depth to 20% of surface 94.3-96.25' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/4" over 30-40% of surface, voids to 1/2" at 94.55', fossiliferous No Recovery 96.25-96.5' Limestone 96.5-101.5' - yellowish gray, (5Y 7/2), medium to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" over 20-30% of surface, fossiliferous (casts/molds)	16:30 Begin R10-NQ	
115 -72.5	R11-NQ 5 ft 80%	72	NR	107.8' - Mechanical break 108.6' - Bedding plane, <20 deg, rough, undulating, open up to 1/8" 109.0' - Mechanical break 109.2' - Fracture, 75 deg, rough, undulating, open up to 1/8" 110.0' - Bedding plane, <5 deg, rough to smooth, undulating, open up to 1/8"	104.0-105.2' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2) 105.2-106.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace tiny voids up to 1/16", poorly fossiliferous, slight increase in fossil casts (approximately 10%) 106.5-111.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), fewer voids about 5% of rock No Recovery 111.3-111.5' Limestone	16:45 Begin R11-NQ	
120 -77.5	R12-NQ 5 ft 100%	78	1	111.7' - Bedding plane, <5 deg, smooth, planar, open up to 1/8" 112.6, 112.7, 112.8' - Bedding plane (3), <5 deg, rough to smooth, undulating, open up to 1/8" 113.6' - Mechanical break 114.0' - Mechanical break 114.6' - Mechanical break	111.5-115.5' - from 111.5-112.7' same as R10-NQ At 112.7' color goes from yellowish gray (5Y 7/2) to light olive gray (5Y 5/2) with depth, fine grained, voids begin to increase with depth to 15%, fossil casts and molds increase to 20% up to 1/4"x1/8", has <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" No Recovery 115.5-116.5' Limestone	17:00 Begin R12-NQ	
125 -82.5	R13-NQ 5 ft 100%	79	4	117.0' - Fracture, 50 deg and 60 deg, rough, undulating 117.5' - Fracture, 50 deg and 60 deg, smooth, undulating 118.7' - Bedding plane, smooth, undulating, open up to 1/8" 119.0' - Mechanical break 119.4' - Mechanical break 120.0' - Bedding plane, <10 deg, rough, undulating, open up to 1/4" 120.3' - Fracture, 85 deg, rough, undulating 120.6' - Mechanical break 121.6, 121.7' - Bedding plane (2), <5 deg, smooth, undulating, open up to 1/8" 121.9' - Fracture, 75 deg, rough, undulating, open up to 1/8" 122.25' - Bedding plane, 20 deg, rough, undulating 123.0' - Mechanical break 123.6' - Fracture, 75 deg, rough, undulating, open up to 1/8" 124.0' - Mechanical break 124.8' - Mechanical break	116.5-121.5' - Same as 106.5-111.5' except light olive gray (5Y 5/2) with <5% very pale orange mottling, very fine to fine grained, trace fossils up to 1/4", casts and molds, trace tiny voids up to 1/16" 119.4-120.6' medium grained, extremely weak (R0) to weak (R2) rock, up to 30% fossil casts up to 1/4", trace dissolution cavities up to 1/4", 10% voids up to 1/16"	07:24 Water level at 4.4' below ground surface 07:31 Drilling R13-NQ SC-4 collected at 124.0-124.8'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-06	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
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 weak (R1 to R2), various layers between dusky yellow (5Y 6/4) and yellowish gray (5Y 5/2) and light olive 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 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" Limestone 126.5-131.5' - Same as 121.5-126.5' except fine grained, extremely weak to weak (R0 to R2), fossiliferous layers have color change from light olive gray (5Y 5/2) to yellowish gray (5Y 7/2) 131.5-134.3' - Same as 126.5-131.5' except only one bedding feature is highly fossiliferous from 133.1-133.25', rock is extremely weak (R0) to very weak (R1) No Recovery 134.3-136.5' Limestone 136.5-137.1' - yellowish gray, (5Y 7/2), fine grained, extremely weak to very weak (R0 to R1), fragments are very light gray (N7) to gray (N5), clasts are very weak (R1) to weak (R2), poorly fossiliferous 137.1-139.0' - light olive gray, (5Y 5/2), fine grained, very weak to medium strong (R1 to R3), dusky 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 No Recovery 139.0-141.5' Limestone 141.5-144.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very 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 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"	07:42 Drilling R14-NQ	
	R14-NQ 5 ft 100%	87	1	126.3' - Bedding plane, 80 deg, rough, undulating, open up to 1/4" 126.6' - Bedding plane, <5 deg, rough to smooth, undulating, open up to 1/4" 127.8' - Bedding plane, <5 deg, smooth, stepped 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 smooth, undulating, open up to 1/4" 129.8' - Mechanical break			
130 -87.5			0				
			1	130.9' - Bedding plane or mechanical break, <5 deg, rough, undulating			
	R15-NQ 5 ft 56%	33	4	131.65, 131.7, 131.95, 132.5' - Bedding plane (4), <5 deg, smooth to rough, undulating, open <1/8"			
135 -92.5			0	133.3' - Fracture, 50 deg, rough, undulating, open up to 1/8" 133.8-134.3' - Mechanical break, multiple fragments			
			NR				
			>10	136.7-137.1' - Fracture zone, intersecting fractures			
	R16-NQ 5 ft 50%	28	0	137.35' - Bedding plane, <5 deg, rough, undulating			
140 -97.5			>10	138.3' - Mechanical break 138.75-139.0' - Fracture zone, intersecting fractures			
			NR				
			1	142.2, 143.0, 144.0, 145.7, 145.9' - Bedding plane (5), <5 deg, smooth, undulating, open up to 1/8"			
	R17-NQ 5 ft 98%	90	1	143.4' - Mechanical break			
145 -102.5			2				
					08:13 Begin R16-NQ		
					08:38 Begin R17-NQ		
					SC-5 collected at 142.2-143.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.5	R18-NQ 5 ft 92%	77	1	145.5' - Mechanical break	Limestone 144.0-146.4' - Same as 141.5-144.0' except dusky yellow, (5Y 6/4), fine to medium grained, extremely weak (R0) at 146.0-146.4', zone at 144.5' and 145.3 are same as 136.5-137.1', extremely weak material (R0), rock at 141.5-144.0' is medium strong (R3) to strong rock (R4) No Recovery 146.4-146.5' Limestone 146.5-151.1' - Same as 141.5-144.0' except interbedded with dusky yellow (5Y 6/4) up to 1' thick, most beds are thick with zones of thin wavy bedding from 150.75-151.1' is same as R10-NQ rock, 146.5-150.75' is medium strong (R3) to strong rock (R4) No Recovery 151.1-151.5' Bottom of Boring at 151.5 ft bgs on 4/26/2007	09:42 Begin R18-NQ SC-6 collected at 147.35-148.15'	
		NR	4	146.65, 146.8' - Bedding plane (2), <5 deg, smooth, undulating, open up to 1/4"			
			0	146.7' - Fracture, 75 deg, smooth, undulating 147.35' - Bedding plane, <5 deg, smooth, undulating 148.15' - Mechanical break			
			3	148.9' - Bedding plane, <5 deg, smooth, undulating, open up to 1/8"			
			>10	149.4, 149.6, 149.9' - Bedding plane (3), <5 deg, smooth, undulating, open up to 1/8"			
			1	149.75' - Mechanical break 150.05-150.15' - Fracture zone, intersecting fractures			
			NR	150.8' - Bedding plane (<5), smooth, undulating, open up to 1/4" 150.95' - Mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 1 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
43.1	0.0	1.0	SS-1	0-2-1 (3)	Poorly Graded Sand With Organics (SP) 0.0-1.0' - dark gray grading to very light gray, (N3 to N8), moist, very loose, very fine to fine grained silica sands, trace nonplastic fines, 10% organics and roots decreasing with depth, last 2.4' is dark yellowish brown (10YR 6/6) with 5% nonplastic fines, trace concretions to 1/2"		Using 2' x 2" split spoon for SPT
	1.5						
5	5.0	0.9	SS-2	3-3-2 (5)	Poorly Graded Sand (SP) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine grained silica sands, trace nonplastic fines, trace sand-sized black particles		SS-2 taken 09:47 Assumed water level at 2.0' due to moisture content in SS-2 and water level measurements at B-9
38.1	6.5						
10	10.0	1.0	SS-3	3-3-5 (8)	Poorly Graded Sand With Silt (SP-SM) 10.0-11.0' - white to very light gray, (N9 to N8), very fine to fine grained silica sands, 10% nonplastic fines, sand-sized black particles		SS-3 taken 09:53 Similar to SS-2
33.1	11.5						
15	15.0	0.9	SS-4	3-3-4 (7)	Poorly Graded Sand With Silt (SP-SM) 15.0-15.9' - mottled white and pale yellowish brown, (10YR 6/2), wet, very fine to fine grained silica sands, 7% nonplastic fines, trace very fine sand-sized black particles		SS-4 taken 09:57
28.1	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 2 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
23.1	20.0	1.1	SS-5	4-5-5 (10)	Silty Sand (SM) 20.0-21.1' - pale yellowish brown, (10YR 6/2), wet, loose, no HCl reaction, very fine to fine grained silica sands, 20% nonplastic fines	| | | | |	SS-5 taken 10:07
	21.5						
25	25.0	1.5	SS-6	2-2-2 (4)	Silty Sand (SM) 25.0-26.5' - pale brown, (5YR 5/2), wet, very loose, no HCl reaction, very fine to fine grained silica sands, 20-25% nonplastic fines	| | | | |	SS-6 taken 10:13
18.1	26.5						
30	30.0	1.5	SS-7	2-2-1 (3)	Poorly Graded Sand With Silt (SP-SM) 30.0-31.5' - yellowish gray, (5Y 7/2), wet, very loose, no HCl reaction, very fine to fine grained silica sand, 6% nonplastic fines, trace very fine sand-sized black particles	| | | | |	SS-7 taken 10:20
13.1	31.5						
35	35.0	1.5	SS-8	1-1-1 (2)	Poorly Graded Sand With Silt (SP-SM) 35.0-36.5' - Same as 30.0-31.5' except yellowish gray, trace medium bluish gray mottling, (5Y 8/1 trace 5B 7/1)	| | | | |	SS-8 taken 10:25
8.1	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 3 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

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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				2-2-3 (5)			
3.1	40.0	1.5	SS-9	2-2-3 (5)	Poorly Graded Sand With Silt (SP-SM) 40.0-41.5' - yellowish gray, (5Y 8/1), wet, loose, no HCl reaction, very fine to fine grained silica sand, 11% nonplastic fines, trace pyrite fragments		SS-9 taken 10:45 Driller's Remark: Switched to 2-7/8" tricone drag bit
	41.5						
45	45.0	1.5	SS-10	2-2-3 (5)	Poorly Graded Sand With Silt (SP-SM) 45.0-46.5' - Same as 40.0-41.5'		SS-10 taken 10:50
-1.9	46.5						
50	50.0	1.5	SS-11	0-1-1 (2)	Poorly Graded Sand With Silt (SP-SM) 50.0-51.5' - moderate yellowish brown to pale yellowish brown, trace medium dark gray mottling, (10YR 5/4 to 10YR 6/2 with N4), wet, very loose, no HCl reaction, very fine to fine grained silica sand, 6% nonplastic fines		SS-11 taken 10:57 Weight of hammer over 4", then 2 blows recorded as 0-1-1 (2)
-6.9	51.5						
55	55.0	1.5	SS-12	0-1-1 (2)	Poorly Graded Sand With Silt (SP-SM) 55.0-56.5' - Same as 50.0-51.5' except medium dark gray to dark gray (N4 to N3) mottling		SS-12 taken 11:06 1 blow for first 12"
-11.9	56.5						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 4 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
-16.9	60.0	1.4	SS-13	0-1-2 (3)	Poorly Graded Sand With Silt (SP-SM) 60.0-61.4' - Same as 50.0-51.5' except dusky blue, (5PB 3/2), trace concretions		SS-13 taken 11:11
	61.5						
							SS-14 has a jumbled appearance
65	65.0	1.5	SS-14	5-6-12 (18)	Clay With Gravel (CL) 65.0-66.4' - mottled grayish blue green and medium dark gray, (5BG 5/2 and N4), moist to wet, very stiff, high plasticity, no dilatancy, 20% fine to coarse gravel, carbonate derived, rounded to subrounded; silty sand (SM) lens at 66.0', 3.0' thick, white (N9) to yellowish gray (5Y 8/1), fine to coarse sand-sized carbonate material, gravel and silty sand have very strong HCl reaction, clay has no HCl reaction		SS-14 taken 13:10
-21.9	66.5						
70	70.0	1.4	SS-15	2-2-3 (5)	Silty Sand (SM) 70.0-71.4' - yellowish gray, (5Y 8/1), wet, very loose, no HCl reaction, very fine to fine grained silica sands, 25% low plasticity fines, scattered irregular pockets of fat clay (CH), grayish blue green (5BG 5/2), high plasticity, 15-20% is fat clay		SS-15 taken 13:26
-26.9	71.5						
75	75.0	1.5	SS-16	4-2-1 (3)	Fat Clay (CH) 75.0-75.2' - moderate yellowish brown, (10YR 5/4), wet, soft, high plasticity, no dilatancy, sandy seam Poorly Graded Sand With Silt (SP-SM) 75.2-76.5' - very pale orange heavily mottled with dark 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		SS-16 taken 13:43
-31.9	76.5						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 5 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-36.9	80.0	1.5	SS-17	1-1-2 (3) Silty Sand (SM) 80.0-81.5' - pale yellowish brown, (10YR 6/2), wet, very loose, trace medium gray laminated mottling, very fine to fine grained silica sand, 25% nonplastic fines, trace very fine sand-sized black particles	SS-17 taken 14:27	Driller's Remark: Light to medium chatter observed while drilling to 85'
	81.5					
85	85.0					
-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 clay is mottled olive black (5Y 2/1) and grayish black (N2), silty sand is dark yellowish brown (10YR 4/2) with black streaks, wet, very loose/soft, trace medium to coarse sand-sized carbonate material with moderate HCl reaction, no HCl reaction in silty sands or fat clays	SS-18 taken 14:32	Driller's Remark: Switch to 2-7/8" tricone roller bit at 15:07 SS-18 may be slough
90	90.0					
-46.9	91.5	1.4	SS-19	4-19-26 (45) Silt (ML) 90.0-90.4' - yellowish gray, (5Y 8/1), nonplastic, rapid dilatancy, moderate to strong HCl reaction, very thinly laminated (<1/16" thick) with olive black (5Y 2/1) (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% fine to coarse gravel-sized, 30% nonplastic fines, all carbonate	SS-19 taken 15:36	
95	95.0					
-51.9	96.5	1.5	SS-20	0-7-47 (54) Sandy Clay With Silt (CL-ML) 95.0-96.5' - yellowish gray, (5Y 8/1), moist, hard, low plasticity, rapid dilatancy, strong HCl reaction, greenish black (5GY 2/1) mottling at 95.8', 10-15% fine to medium sand-sized, trace organics in pockets	SS-20 taken 15:51	Weight of hammer for first 6"
100						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
-56.9	100.0	0.5	SS-21	38-50/2 (88/8")	Silty Sand (SM) 100.0-100.5' - yellowish gray to very light gray, (5Y 7/2 to N8), wet, very dense, strong HCl reaction, fine to coarse sand-sized, 25% low plasticity fines, 10% fine gravel-sized, all carbonate	SS-21 taken 17:03 11:50 100% circulation loss at 101.0' Switch to 2-3/8" tricone roller drill bit 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 bit to advance boring, AWJ rods	
100.7							
105	105.0	0.9	SS-22	10-6-23 (29)	Silty Sand (SM) 105.0-105.9' - yellowish gray, (5Y 7/2), wet, medium dense, strong HCl reaction, fine to coarse sand-sized, 35% low plasticity fines, 10% fine to coarse gravel-sized, all carbonate	Light chatter while drilling with drag bit 10:40 Driller's Remark: Reached 90.0-91.0' and lost complete circulation Installed 4" HW casing to 105.0' below ground surface	
-61.9	106.5						
110	110.0	1.5	SS-23	13-22-11 (33)	Silty Sand With Limestone Fragments (SM) 110.0-111.5' - very light gray to light gray, (N5 to N7), wet, dense, strong HCl reaction, fine to coarse sand-sized, 35% fine to coarse gravel-sized limestone fragments, 20% low plasticity fines, material is carbonate and highly fossiliferous	SS-23 taken 14:55	
-66.9	111.5						
115	115.0	0.9	SS-24	7-2-29 (31)	Silty Sand With Limestone Fragments (SM) 115.0-115.85' - Same as 110-111.5'	SS-24 taken 15:13 Last SPT on 5/5/07	
-71.9	116.5						
120							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07	SHEET 7 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
 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 bgs on 5/4/07 START : 5/4/2007 END : 5/6/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
-76.9	120.0	1.5	SS-25	13-18-19 (37)	Silty Sand With Limestone Fragments (SM) 120.0-121.8' - yellowish gray, (5Y 8/1), wet, dense, strong HCl reaction, fine to coarse sand-sized, 42% low plasticity fines, 15-20% fine fragments-sized carbonate derived, highly fossiliferous with molds and casts		Start drilling on 5/6/07 at 8:05 Water level at 6.4' below ground surface at beginning of day
	121.5						
125	125.0	0.9	SS-26	37-50/5 (87/11")	Silty Sand With Limestone Fragments (SM) 125.0-125.9' - Same as 120-121.8' except 25-30% gravel-sized material in wafer-like lenses up to 1/4"-1/2" thick		Driller's Remark: Continued circulation loss from 120-125' - gained a little back at 125.0'
-81.9	125.9						
130	130.0	0.4	SS-27	50/5.5 (50/5.5")	Silty Sand With Limestone Fragments (SM) 130.0-130.4' - Same as 125.0-125.9' except trace organic fragments		Driller's Remark: 130-135' drilled fairly hard and consistent
-86.9	130.5						
135	135.0	0.1	SS-28	50/4.5 (50/4.5")	Limestone Fragments 135.0-135.1' - strong HCl reaction		Chatter at 136-136.5' Driller's Remark: Harder
-91.9	135.4						
	137.5	0.0	SS-29	50/2 (50/2")	No Recovery 137.5-137.6' Begin Rock Coring at 137.5 ft bgs See the next sheet for the rock core log		End soil sampling at 10:35 on 5/6/07 Switch to rock coring, see rock core log
	137.6						
140							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
140 -96.9	R1-NQ 4 ft 75%	35	7	137.6-137.8' - Fractures (3), horizontal, smooth to rough, undulating to stepped, heavy drill action marks, open 137.9' - Fracture, horizontal, rough, stepped, possible black staining over 50% of surface, with 1/4" 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, undulating, 1/16" relief, open 138.35' - Bedding plane, 15 deg, rough, planar, tight	Limestone 137.5-138.7' - yellowish gray, (5Y 8/1), strong HCl reaction, medium strong (R3), banded with silt lenses between 1/4" and 2", small voids to 1/16" over 25% of surface in a few lenses, trace fossil molds, casts, cross-bedding from 138.5-138.7', strongly cemented 138.7-139.2' - Same as 137.5-138.7' 139.2-140.5' - very weak (R1), becomes more massive, highly fossiliferous with molds, casts, clasts of different limestone, subrounded, moderately cemented No Recovery 140.5-141.5' Limestone 141.5-143.5' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), very few voids of any size, massive appearance, scattered black grains (pyrite), trace fossils 143.5-144.4' - strong HCl reaction, becomes banded with gray particles throughout, 50% of surface covered with voids to 1/16" 144.4-146.5' - moderate HCl reaction, medium strong (R3), trace voids to 1/16", trace fossil molds, casts 145.3-146.5' - mild to moderate HCl reaction, infilling in two 1.2" thick bands 146.5-150.3' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (molds, casts), echinoderms, brownish black laminations over 146.5-146.8', voids <1/16" over 30-35% surface over 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' Bottom of Boring at 151.5 ft bgs on 5/6/2007	Driller starts with new bit: Boart Longyear Alpha bit 4050089 NQ 06 R8 at 155 Limestone from 137.5-151.5' appears to be detrital limestone	
			3				
			1				
			NR				R1: 8 minutes
145 -101.9	R2-NQ 5 ft 100%	76	3	138.4' - Bedding plane, horizontal, bottom surface is rough, undulating, heavy wear on upper side from drilling, <1/16" relief, open 138.7' - Mechanical break 138.9' - 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, 5 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, open 141.8, 142.1' - Fractures, 70 deg, rough, undulating, 1/16" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 1/16" relief, accretions of iridescent pyrite covering 30% of surface, tight 143.6' - 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"			SC-1 collected at 142.1-143.1'
			2				
			1				
			4				R2: 17 minutes
			0				
150 -106.9	R3-NQ 5 ft 76%	60	4	140.1' - Mechanical break 141.6' - Mechanical break, 0-90 deg, rough, 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, 1/16" relief, accretions of iridescent pyrite covering 30% of surface, tight 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"			
			1				
			1				
			NR			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, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of break, open up to 3/8"		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	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 1 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
43.2	0.0	1.2	SS-1	2-2-3 (5)	Poorly Graded Sand With Organics (SP) 0.0-1.2' - medium dark gray grading to very light gray, (N4 to N8), moist, loose, fine grained, no HCl reaction, trace nonplastic fines, 20% organics and roots decreasing with depth, silica sand		
	1.5						
5 38.2	5.0	1.0	SS-2	7-7-6 (13)	Poorly Graded Sand (SP) 5.0-6.0' - white to yellowish gray, (N9 to 5Y 8/1), wet, medium dense, fine grained, no HCl reaction, trace nonplastic fines, silica sand		
	6.5						
10 33.2	10.0	1.0	SS-3	7-9-8 (17)	Poorly Graded Sand (SP) 10.0-10.1' - Same as 5.0-6.0' Silty Sand (SM) 10.1-11.0' - streaked light gray to medium gray, (N7 to N5), moist to wet, medium dense, very fine to fine grained, no HCl reaction, 15% low to medium plastic fines, silica sand		
	11.5						
15 28.2	15.0	0.9	SS-4	5-8-11 (19)	Poorly Graded Sand With Silt (SP-SM) 15.0-15.9' - yellowish gray, (5Y 8/1), wet, medium dense, very fine to fine grained, no HCl reaction, 10% nonplastic fines, silica sand		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 2 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
				6-6-7 (13)			
23.2	20.0	1.5	SS-5	6-6-7 (13)	Poorly Graded Sand With Silt (SP-SM) 20.2-21.5' - yellowish gray, (5Y 8/1), wet, medium dense, very fine to fine grained, no HCl reaction, 5-10% nonplastic fines, silica sand		1.65' recovery noted on log
	21.5						
25	25.0						
18.2		1.5	SS-6	7-3-2 (5)	Poorly Graded Sand With Silt (SP-SM) 25.0-26.5' - Same as 20.0-21.5'		2.0' recovery noted on log
	26.5						
30	30.0						
13.2		1.5	SS-7	1-2-2 (4)	Silty Sand (SM) 30.0-31.5' - yellowish gray, (5Y 7/2), wet, loose, fine grained, no HCl reaction, 15-20% nonplastic fines, silica sand		1.7' recovery noted on log
	31.5						
35	35.0						
8.2		1.5	SS-8	2-1-2 (3)	Poorly Graded Sand With Silt (SP-SM) 35.0-36.5' - yellowish gray, (5Y 7/2), wet, very loose, very fine to fine grained, no HCl reaction, 8% nonplastic fines, silica sand		1.75' recovery noted on log
	36.5						
40							



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
3.2	40.0	1.5	SS-9	1-1-2 (3)	Silty Sand (SM) 40.0-41.5' - Same as 35.0-36.5' except pale yellowish gray, (5Y 8/1), 20% nonplastic fines, black (organic) staining from 40.5-40.6'		Driller's Remark: Weight of hammer causes 2' rod drop from 37-55' 2.0' recovery noted on log
	41.5						
45	45.0	1.5	SS-10	1-1-2 (3)	Silty Sand (SM) 45.0-46.5' - Same as 40.0-41.5' except 25% nonplastic fines, trace black (possibly organic) staining from 45.25-45.35'		1.8' recovery noted on log
-1.8	46.5						
50	50.0	1.5	SS-11	0-1-1 (2)	Silty Sand (SM) 50.0-51.5' - Same as 45.0-46.5' except limestone fragments in top 1" of sample, rock fragments are fossiliferous, no HCL reaction, trace coarse sand-sized concretions		1.75' recovery noted on log
-6.8	51.5						
55	55.0	1.3	SS-12	0-1-5 (6)	Silty Sand (SM) 55.0-56.3' - moderate yellowish brown, (10YR 5/4), wet, loose, very fine to fine grained, no HCL reaction, 40% low plasticity fines, trace moderate gray (N5) to dark reddish brown (10YR 3/4) concretions or pyrite nodules in upper 4" of sample, black (organic) staining over bottom 6" of sample		Driller's Remark: "Drastic" change of material at 57.5', harder and different in color ("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'
-11.8	56.5						
60							



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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-16.8	60.0 60.6	0.6	SS-13	25-50/1 (75/7")	Elastic Silt (MH) 60.0-60.6' - very light gray, (N8), mottled with yellowish gray (5y 8/1), wet, hard, high plasticity, slow dilatancy, 10-15% fine sand (both silica and carbonate), pyrite nodules in top 1.5" of sample to 3/4", mild HCl reaction in carbonate materials, most of sample is non-reactive	|||	HW casing advanced to 61'
65 -21.8	65.0 65.4	0.4	SS-14	50/5 (50/5")	Clayey Sand (SC) 65.0-65.4' - light gray to yellowish gray, (N7 to 5Y 8/1), wet, very dense, medium to coarse grained, moderate HCl reaction in carbonate materials, subangular grains (carbonate material with trace pyrite), 5-10% fine grained silica sand, 25% medium to high plasticity fines	///	1.0' recovery noted on log
70 -26.8	70.0 71.5	1.2	SS-15	16-17-12 (29)	Interbedded Poorly Graded Sand With Clay To Clayey Sand And Fat Clay (SP-SC, CH) 71.0-71.2' - 60% sand: yellowish gray (5Y 8/1), wet, medium dense, fine silica sand, 5-10% medium sand-sized carbonate grains in upper half of sample, variable fine (10-30%) content, medium plasticity, mild HCl reaction in carbonate grains, 40% of sample fat clay (CH): greenish gray (5G 6/1), moist, high plasticity, at 70.0-70.5' clay in 3/4" irregular beds, at 70.5-71.2' clay occurs in 1-3/16" to 2" lenses interbedded in sand	///	
75 -31.8	75.0 76.5	1.5	SS-16	4-2-4 (6)	Poorly Graded Sand With Silt (SP-SM) 75.0-76.4' - yellowish gray, (5Y 7/2), wet, loose, very fine to fine grained, no HCl reaction, 5% nonplastic fines, trace black mottling at 75.2-75.3', silica sand	|||	6/16/07: Water level at 4.5' 8:15: HW casing to 70' 8:30: At 75.0' switch to 2-7/8" rock bit 8:57 Driller's Remark: Casing slid approx. 2-1/2' down borehole, added 5' HW casing (to 75')
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 5 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-36.8	80.0	1.4	SS-17	1-0-50/5 (50/11")	Silty Sand (SM) 80.0-80.9' - yellowish gray, (5Y 7/2), wet, very loose, very fine to fine grained, no HCl reaction, 20-25% nonplastic fines, silica sand Organic Lens (OL) 80.9-81.1' - brownish black, (5YR 2/1), shiny slickensided appearance, may be compressed leaves Elastic Silt (MH) 81.1-81.4' - medium gray, (N5), moist, hard, medium plasticity, slow to rapid dilatancy, strong HCl reaction, mottled		
	81.4						
85	85.0	0.1	SS-18	50/1.5 (50/1.5")	Silt With Sand (ML) 85.0-85.1' - dusky yellow, (5Y 6/4), moist, hard, nonplastic, rapid dilatancy, strong HCl reaction, 15-20% fine to medium sand, all carbonate		0.3' recovery noted on log Driller's Remark: Clay lens at 87.5-88.0' Driller's Remark: Very soft at 88.5'
-41.8							
90	90.0	1.5	SS-19	6-9-29 (38)	Silt (ML) 90.0-91.5' - light olive gray, (5Y 5/2), wet, hard, nonplastic, slow to rapid dilatancy, strong HCl reaction, 10-15% fine to medium sand-sized particles (carbonate), carbonate silt		1.6' recovery noted on log
-46.8							
95	95.0	0.3	SS-20	50/5.5 (50/5.5")	Silty Sand And Limestone Fragments (SM) 95.0-95.3' - yellowish gray, (5Y 8/1), wet, very dense, strong HCl reaction, fine sand-sized carbonate particles, 25% non to low plasticity fines, limestone fragments to 1/2" in "wafer" like pieces, 50% silty sand/50% limestone		Driller's Remark: Losing circulation at 95.0'
-51.8	95.5						
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 6 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-56.8	100.0	1.5	SS-21	22-33-45 (78)		1.6' recovery noted on log
	101.5					
105	105.0	0.9	SS-22	37-50/5 (87/11")		1.35' recovery noted on log
-61.8	105.9					
110	110.0	1.3	SS-23	30-50-50/3 (100/9")		Driller's Remark: Likely to have no recovery if coring begins at 105.0' 2.0' recovery noted on log
-66.8	111.3					
115	115.0	1.2	SS-24	25-31-32 (63)		15:12: Instruct driller to take one more spoon 115.0'-120.0' and if limestone present, begin coring with NQ
-71.8	116.5					
						Driller extends casing (HW) to 110.0'
						06/17/07: Water level at 8.0'
						8:45: Driller clear hole with tri-cone roller bit
120						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 7 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-76.8	120.0	0.2	SS-25	50/3.5 (50/3.5")	Silty Sand With Limestone Fragments (SM) 120.0-120.2' - Same as 115.0-116.2'		Resume drilling 6/16/07 at 8:57 Driller setting rod for SPT at 120.0'
	124.5						Split spoon SS-26 driven from 125.0-125.15'
125 -81.8		0.2	SS-26	50/2 (50/2")	Limestone Fragments 125.0-125.15' - yellowish gray, (5Y 8/1), strong HCl reaction, friable Begin Rock Coring at 125.0 ft bgs See the next sheet for the rock core log		Driller's Remark: 5% return of mud from 125-130' Switched to NQ WL to begin rock core at 125.0'
130 -86.8							
135 -91.8							
140							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-81.8	125.0	13	6	125.0, 125.1' - Bedding plane (2), horizontal, smooth, planar, fractures, open		Limestone 125.0-129.4' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), 10% voids up to 1/16", 5% casts/cavities up to 3/4"x3/8", poorly fossiliferous, slightly harder (R1-R2) from 127.9'-129.9' No Recovery 129.4-130.0'	Start rock coring at 125' with NQ WL casing	
			>10	125.35, 125.5' - Fractures (2), horizontal, rough, planar, open, some rock fragments (3)				
			>10	125.85, 125.9' - Fractures (2), horizontal, rough, undulating, open				
			3	126.0-127.9' - Fracture zone, smooth to rough, planar, bedding plane fractures, thin (1/2") beds, open to tight				
			2	128.6, 128.9, 129.0' - Fractures (3), horizontal, rough, undulating, open				
130	130.0	19	NR	129.1, 129.2' - Fractures (2), horizontal, rough, undulating to stepped, open		No Recovery 129.4-130.0' Limestone 130.0-130.1' - Same as 125.0-129.4' 130.1-131.55' - yellowish gray mottled with light gray, (5Y 7/2 and N7), moderate HCl reaction, weak to medium strong (R2 to R3), mottling associated with large cavities over 40% of surface, carbonate, fine to medium grained, 5-10% voids up to 1/8", 25% cavities (up to 2-3/8"x1-9/16" at 130.4-130.55', 130.75-130.8'), cavities infilled with carbonate material (pale yellowish brown, medium grained, weak (R2), 25% voids, mild HCl reaction, poorly fossiliferous) 131.55-132.45' - very pale orange, (10YR 8/2), fine grained, moderate HCl reaction, very weak (R1), thinly bedded (1/4"-1/2"), trace voids to 3/16", no visible casts, 25% extremely weak (R0), irregular gray lenses 132.45-133.75' - yellowish gray, mottled light gray, and very pale orange, (5Y 7/2, N7, and 10YR 8/2), fine grained, strong HCl reaction, medium strong (R3), 5-10% voids up to 1/16" increasing with depth, trace cavities up to 9/16"x3/8" No Recovery 133.75-135.0' Limestone 135.0-138.95' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids to 1/6", trace casts/cavities to 1/4", poorly fossiliferous (with small 3/16" shell fragments)	R1: 3 minutes	
-86.8			3	130.1' - Fracture, horizontal, rough, undulating, open				
			>10	130.4' - Fracture, horizontal, rough, undulating, open, associated with large infilled cavity				
			>10	130.9, 131.0, 131.45' - Fractures (3), horizontal, rough, undulating, open, sandy organic soil infilling at 131.45'				
			4	131.26-131.4' - Fracture zone, sandy black (possibly organic) soil infilling				
135	135.0	18	NR	131.6-131.85' - Fracture zone		R2: 6 minutes		
-91.8			>10	131.9, 132.1, 132.2' - Bedding plane (3), <10 deg, rough, undulating				
			>10	132.0-132.05' - Clay seam, (CH), reacts with HCl				
			7	132.3-132.45' - Fracture zone				
			6	132.45-133.0' - Fracture, vertical, smooth, undulating, open, 70% light gray staining				
		0	133.0-133.1' - Fractures (3), horizontal, vertical, and 30 deg, rough, undulating, open		R3: 4 minutes			
		NR	133.0-133.1' - Fractures (3), horizontal, vertical, and 30 deg, rough, undulating, open					
		7	135.0-136.4', 136.6-136.8' - Bedding plane, horizontal, smooth, planar, fractures every 1/2" over interval, open					
		6	137.05, 137.15, 137.2, 137.6, 137.8, 138.05, 138.15, 138.25, 138.35, 138.5' - Fractures (10), horizontal, smooth to rough, planar					
		0	138.95' - Fracture, horizontal, rough, undulating, pale yellowish brown (10YR 6/2) clay infill up to 1/4" thick, open					
140	140.0	48	NR			R3: 4 minutes		
-96.8			0					
			1	141.7' - Mechanical break				
			>10	141.9' - Fracture, horizontal, smooth, planar, open				
			3	142.05-142.1' - Carbonate silt seam (possible infill of fracture with cuttings from drilling)				
		0	142.15, 142.2, 142.3, 142.4, 142.5, 142.65, 142.7, 142.8, 142.9, 143.05' - Fractures (10), horizontal, smooth to rough, undulating, open		R4: 5 minutes			
		NR	143.3' - Fracture, horizontal, smooth, undulating, open					
145	145.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-07A	SHEET 9 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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 6/16/07 START : 6/15/2007 END : 6/17/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-101.8	R5-NQ 5 ft 77%	42	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 medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" in size, trace voids to 3/8" in size, no visible cavities/casts No Recovery 139.4-140.0' Limestone 140.0-142.05' - Same as 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' 142.05-144.15' - yellowish gray, (5Y 7/2 to 5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), 10% voids up to 1/16", trace casts/cavities up to 5/16"x3/16" at 143.5-144.4', irregular gray laminations and thread-like mottling in 1/16" to 3/16" thick bands at 142.0-142.4' No Recovery 144.15-145.0' 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 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	R5: 5 minutes 6/17/07 15:30: 15' HW casing removed to ensure no lock up in boring 6/18/07 8:02 Driller's Remark: Bottom of hole tagged to 138.5' over newer cave-in after casing removal	
			2	145.1, 145.2, 145.35' - Fractures (3), horizontal, smooth, undulating, open			
			>10	145.15-145.35' - Fracture, vertical, smooth, undulating, open			
			1	145.85' - Fracture, horizontal, smooth to rough, undulating			
			NR	146.35' - Fracture, <10 deg, rough, undulating, open			
150 -106.8	150.0			146.95, 147.0, 147.2, 147.4' - Fractures (4), horizontal, rough, undulating, open			
				147.0-147.4' - Fracture, vertical, rough, undulating, open			
				147.5, 147.55, 147.65' - Fractures (3), horizontal, smooth, planar to undulating, open			
				147.65-147.8' - Fracture zone			
				147.95, 148.7' - Fractures (2), horizontal, rough, undulating, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faureto, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
42.4	0.0	0.9	SS-1	1-1-1 (2)	Poorly Graded Sand With Organics (SP) 0.0-0.9' - dark gray, (N2), dry to moist, very loose, angular to sub angular, fine silica sand, 25-30% 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 Water level assumed at approximately 4.0' below ground surface
	1.5						
5 37.4	5.0	1.0	SS-2	4-3-4 (7)	Silty Sand (SM) 5.0-6.0' - yellowish gray, (5YR 7/2), wet, loose, fine subangular, silica sands, 12% nonplastic fines, brownish black (5YR 2/1), a few very large roots (>5"), with rootlets (<1/8" x 1/8")		
	6.5						
10 32.4	10.0	1.0	SS-3	20-34-50/5 (84/11")	Silt (ML) 10.0-11.0' - moderate yellow, (5YR 7/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% fine to medium sand-sized carbonate particles, friable, trace black fine sand-sized, trace white carbonate grains, all carbonate		Driller's Remark: 100% circulation loss after pulling out spoon 09:30: Install 10' 6" casing, additional 5' of 6" casing installed 11:00: 15' 6" casing installed to 14.0' below ground surface (1 foot stick up height), drilling and doing SPTs with a NW casing sized stabilizer installed on AWJ rods just above drill bit
	11.4						
15 27.4	15.0	1.2	SS-4	31-24-17 (41)	Silty Sand With Limestone Fragments (SM) 15.0-16.25' - grayish yellow, (5Y 8/4), wet, dense, fine to coarse grained, moderate HCl reaction, sand-sized 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 (5G 6/6) material, all carbonate		13:53: Switched to 5 1/2" tricone bit, 100% circulation loss after pulling out spoon, add 1/2 bag bentonite
	16.5						
20							



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
 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 : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurete, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
22.4	20.0	0.1	SS-5	50/3 (50/3")	Limestone Fragments 20.0-20.3' - Same as 15.0-16.25' except poor recovery		14:12: Full circulation loss, Driller's Remark: add another 5' 6" casing section, adding 1/2 bag bentonite to mud vat
25 17.4	25.0	0.6	SS-6	13-50/4.5 (63/10.5")	Limestone Fragments 25.0-25.2' - Same as 15.0-16.25' 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"		Driller's Remark: Drill bit slippage from 23.0'-24.0' 14:47: Add 1/2 bag bentonite to mud vat
30 12.4	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 (casts/molds, shells), white-grayish yellow (5Y 8/1) and moderate yellow (5Y 7/6), all carbonate		15:10 Driller's Remark: No circulation, add 4" HW casing, 30' HW casing (4") installed
35 7.4	35.0 35.3	0.3	SS-8	50/4 (50/4")	Limestone Fragments 35.0-35.3' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, mild HCl reaction, fine gravel-sized angular fragments, 10-15% nonplastic fines		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-08	SHEET 3 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
 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 : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	40.0	0.2	#TYPE				
2.4	40.0	0.2	SS-9	50/5 (50/5")	Limestone Fragments 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 black organics Begin Rock Coring at 41.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Install 4" HW casing to 40' below ground surface
45 -2.6							
50 -7.6							
55 -12.6							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
41.0	R1-NQ 5 ft 54%	33	NR	43.3-43.9' - Fracture zone, 1"-2" fragments	No Recovery 41.0-43.7' Limestone 43.7-46.0' - moderate olive brown, (5Y 4/4), wet, moderate HCl reaction, very weak (R1), highly fossiliferous (casts/molds), 15-20% voids on surface up to 1/16", 5-7% cavities infilled with medium gray (N5) up to 3/8", trace black sand-sized coarse grained and short 3/4" discontinuous laminations (<1/16" thick) No Recovery 46.0-48.3'	Start R1-NQ at 09:00 on 5/21/07, water level 6" SW casing at 4.9' below ground surface, 4" HW casing to 41.0', will advance 4" HW casing after pulling out R1-NQ Driller's Remark: First 1.5' of run very fast drilling-slippage; will assume core loss occurs at top of run 4" HW casing installed to 47.0' below ground surface R1: 4 minutes	
45 -2.6				45.6, 45.8' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight			
46.0	R2-NQ 5 ft 46%	24	NR	48.95' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2" 49.1, 49.4' - Bedding plane or mechanical break (2), 25 deg, rough, undulating, tight 49.5, 49.6' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16"	Limestone 48.3-51.0' - Same as 43.7-46.0' 51.0-55.3' - medium olive brown, (5Y 4/4), moderate HCl reaction, weak to medium strong (R2 to R3), poorly to moderately fossiliferous (casts), 15-20% spheroidal voids mostly <1/16", trace coarse sized black grains, carbonate fines/silts from 54.6-54.85', fossil casts from 1/8"-1/2"	R2: 2 minutes	
50 -7.6				49.9, 50.1' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/8" for 49.9', tight for 50.1' 50.4, 50.5' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16"			
51.0				51.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 51.75' - Fracture, 50 deg, rough, undulating, tight 52.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 53.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1", very weak rock, friable			
55 -12.6	R3-NQ 5 ft 86%	72	NR	53.3' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 54.6-54.85' - Fracture zone, extremely weak, carbonate silt 56.85-58.5' - Fracture, extremely to very weak rock	No Recovery 55.3-56.0' Limestone 56.0-60.3' - moderate olive brown, (5Y 4/4), moderate HCl reaction, medium strong rock (R3) from 56.0-56.85', 56.8-58.5' black fine carbonate laminations, medium strong rock (R3), grading to very weak rock (R1) 58.5-60.3', 56.0-58.5', 5-10% voids/casts <1/16", 58.5-60.3', 30-35% voids <1/16", 3-7% medium sized black grains in rock matrix (carbonaceous)	R3: 5 minutes	
56.0				58.75' - Fracture, 50 deg, rough, undulating, tight			
60 -17.6	R4-NQ 5 ft 86%	45	NR	60.0, 60.2' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight			
61.0							
					No Recovery 60.3-61.0'	R4: 3 minutes SC-1 collected at 58.75-60.0'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
65 -22.6 66.0 70 -27.6 71.0 75 -32.6 76.0 80 -37.6 81.0	R5-NQ 5 ft 100%	90	0	61.2, 61.7, 63.1, 64.2, 65.4' - Fractures (5), horizontal, rough, undulating, tight		Limestone 61.0-66.0' - light olive brown, (5Y 5/6), moderate to strong HCl reaction, weak (R2), 63.0-64.0' medium strong rock (R3), 20-25% voids/casts decreasing to 10-15% below 64.0', moderately fossiliferous (casts, few molds), trace black fine to medium grain sized, 3-7% medium to coarse sized, medium dark gray (N4) intraclasts from 65.5-66.0', subrounded bedding interval from 64.0-66.0', short discontinuous (3/8") black laminations and fine grain black grained, 20% staining in olive gray (5Y 3/2) 66.0-71.0' - light olive brown, (5Y 5/6), moderate HCl reaction, similar to 61.0-66.0', medium strong rock (R3), 66.0-66.8' weak rock (R2), 68.7-69.7' extremely weak rock (R0), 10-15% voids <1/16", 5-10% medium dark gray (N4), medium to coarse grained intraclasts, discontinuous, 68.7-69.7' short horizontal black laminations, trace olive gray (5Y 4/1) staining Limestone 71.0-75.7' - light olive brown to moderate olive brown, (5Y 5/6 to 5Y 4/4), moderate to strong HCl reaction, poorly fossiliferous (casts), medium strong rock, R3, from 71.0-72.5', very weak rock, R1, to extremely weak rock, R0, from 72.5-74.2', medium strong, R3, from 74.2 to 75.7', 10-15% voids <1/16" over 71.0-72.5', 35-40% voids <1/16" over 74.2-75.7', poorly fossiliferous (casts), bottom 2" has gritty feel, medium dark gray (N4) intraclast as seen in 66.0-71.0' interval No Recovery 75.7-76.0' No Recovery 76.0-78.0'	R5: 5 minutes
			1	62.75' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"			
			0	63.5' - Mechanical break			
			1	64.8' - Fracture, 50 deg, rough, undulating, tight			
			1	65.75' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
	R6-NQ 5 ft 100%	88	3	66.55' - Fracture, 35 deg, rough, undulating, open 5/8"			
			0	66.8, 66.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight			
			0	67.9, 68.3, 68.55, 68.7, 68.75' - Mechanical break (5)			
			2	69.6' - Bedding plane, 20 deg, rough, undulating, tight, very weak rock (R1)			
			0	69.9' - Fracture, 60 deg, rough, undulating, tight			
R7-NQ 5 ft 94%	77	0	72.0' - Fracture, 35 deg, rough, undulating, tight				
		0	72.6' - Bedding plane, horizontal, rough, undulating, tight				
		0	73.95, 75.1' - Fractures (2), horizontal, rough, undulating, tight				
		1					
		NR					
R8-NQ 5 ft 60%	28	>10	78.0-78.4' - Fracture zone				
		>10	78.5' - Fracture or mechanical break, horizontal, rough, undulating, open 1/16"				
		>10	78.8' - Fracture, 15-20 deg, rough, undulating, open 1/6"				
		0	78.95' - Fracture or mechanical break, horizontal, open 1-1/4"				



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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
105 -62.6	R13-NQ 5 ft 90%	65	1	99.4' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1"	[Symbolic Log]	Limestone 96.0-99.8' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak (R1), grading to weak rock (R2), highly fossiliferous (casts, molds), 1/2" fossils decreases with depth, trace brownish black (5YR 2/6) infill, diverse fossil types over upper 2.0' and lower 0.5', 10-15% medium gray (N5) fine to medium sized No Recovery 99.8-101.0' Limestone 101.55, 102.0' - Fractures (2), 70 deg, rough, undulating, tight 102.2' - Bedding plane, horizontal, rough, undulating, tight 102.7' - Fracture, 70 deg, rough, undulating, tight 102.95' - Fracture, 40 deg, rough, undulating, tight 103.1' - Fracture, 60 deg, rough, undulating, dark gray stains over 80%, tight 103.5' - Fracture, 30 deg, rough, undulating, tight 104.7' - Fault, 40 deg, rough, undulating, tight, 50% dark gray staining	R13: 5 minutes	
			4	102.2' - Bedding plane, horizontal, rough, undulating, tight				
			2	102.7' - Fracture, 70 deg, rough, undulating, tight				
			1	102.95' - Fracture, 40 deg, rough, undulating, tight				
			0	103.1' - Fracture, 60 deg, rough, undulating, dark gray stains over 80%, tight				
			NR	103.5' - Fracture, 30 deg, rough, undulating, tight				
110 -67.6	R14-NQ 5 ft 100%	98	0	104.7' - Fault, 40 deg, rough, undulating, tight, 50% dark gray staining	[Symbolic Log]	No Recovery 105.5-106.0' Limestone 106.0-111.0' - Same as 96.0-99.8' except yellowish gray, (5Y 7/2), strong HCl reaction, 20-25% medium dark gray (N4), fine medium sized grains No Recovery 105.5-106.0' Limestone 106.0-111.0' - Same as 96.0-99.8' except yellowish gray, (5Y 8/1), with gradational change to smaller (mostly microforams) fossils starting at 107.5'	R14: 5 minutes	
			0					
			2	108.4' - Fracture, 60 deg, rough, undulating, black staining over 100% surface, tight				
			1	108.75' - Fracture, 30 deg, black staining over 100% of surface				
			3	109.3' - Fracture, 70 deg, rough, undulating, trace dark gray (N3) staining, tight				
115 -72.6	R15-NQ 5 ft 98%	80	1	110.25' - Fracture, 70 deg, rough, undulating, dark gray stains over 100% over surface, tight	[Symbolic Log]	Limestone 110.0-115.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), gritty/powder-like feel, highly fossiliferous (microforams, shells, casts, molds), grain size increases with depth, 15-20% fine sized, medium dark gray (N4) grains in matrix No Recovery 115.9-116.0' Limestone 111.0-115.9' - Fracture, 70 deg, rough, undulating, dark gray stains over 100% of surface 110.75' - Fracture, 70 deg, rough, undulating, dark gray stains over 100% of surface, tight 111.1' - Bedding plane or mechanical break, horizontal, rough, planar, tight, open 1/16" 112.0' - Fracture or mechanical break, 40 deg, rough, undulating, tight 112.5' - Fracture, 60 deg, rough, undulating, open 1/16" 113.3' - Fracture or mechanical break, horizontal, rough, undulating, tight 115.2' - Fracture, 75-80 deg, rough, undulating, open 1/16" 115.8' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/16"	SC-5 collected at 112.5-113.3'	
			2	110.75' - Fracture, 70 deg, rough, undulating, dark gray stains over 100% of surface, tight				
			1	111.1' - Bedding plane or mechanical break, horizontal, rough, planar, tight, open 1/16"				
			0	112.0' - Fracture or mechanical break, 40 deg, rough, undulating, tight				
			2	112.5' - Fracture, 60 deg, rough, undulating, open 1/16"				
			NR	113.3' - Fracture or mechanical break, horizontal, rough, undulating, tight				
120 -77.6	R16-NQ 5 ft 100%	100	0	115.8' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/16"	[Symbolic Log]	No Recovery 115.9-116.0' Limestone 116.0-118.5' - yellowish gray, (5Y 8/1), medium grained, strong HCl reaction, highly fossiliferous (microforams, casts, molds), 15-25% moderate dark gray (N4) intraclasts, 160.4' bedding contact, fossil casts >3/4" (corals) 117.2' - Fracture, 70 deg, rough, undulating, tight, large casts 118.5-121.0' - yellowish gray, (5Y 7/2), 5/8" through coring cavities infilled at 118.7', fossil casts >1/2" fragments (yellowish gray, medium dark gray, light olive brown) medium sized grains	R15: 5 minutes	
			1	117.2' - Fracture, 70 deg, rough, undulating, tight, large casts				
			0	118.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight				
			2	119.25' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, fracture through bioturbated zone				
			0	119.6' - Bedding plane or mechanical break, horizontal, rough, planar, tight			R16: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -82.6	R17-NQ 5 ft 54%	37	NR	>10	123.3-123.7' - Fracture zone, subangular to subrounded 3/4"-1 5/8" limestone fragments, very weak (friable texture) rock (R1) 123.85, 124.0' - Bedding plane (2), horizontal, rough, planar, open 1/16"	No Recovery 121.0-123.3' Limestone 123.3-123.85' - yellowish gray, (5Y 8/1), highly fossiliferous (fragments, shells, molds, casts), friable 123.85-126.0' - strong HCl reaction, very weak (R1), highly fossiliferous (casts, shells), 1/2"x1/2" shells, 10-15% voids <1/16", very fine to medium grain rock texture, 7-10% yellowish gray (5Y 7/2) mottling 126.0-128.0' - Same as 123.85-126.0'	07:40: Water level on 5/22/07 at 4.9' below ground surface in 6" SW casing	
126.0			2	125.3' - Bedding plane, horizontal, rough, undulating, open 1/16" 125.4' - Bedding plane, rough, undulating, tight, fracture through/across bedding plane 126.05, 126.15, 127.45, 127.55, 127.65, 129.75' - Bedding plane or mechanical break (6), horizontal, rough, planar, open <1/16"	R17: 5 minutes Add 7.0' of 4" HW casing, now set at 53.0' below ground surface			
130 -87.6	R18-NQ 5 ft 78%	56	2	3	127.9-128.0' - Fracture zone, horizontal, rough, undulating 128.4, 129.55, 129.55' - Bedding plane or mechanical break (3), horizontal, rough, undulating, tight	Limestone 128.0-129.9' - medium grained, strong HCl reaction, very weak (R1), friable, 20-25% medium grained sized, medium dark gray (N4) grains, rounded to subrounded, grain size coarsens with depth, 128.0-128.4' very fine grain with >1/2" casts, crystalline carbonate material in rock matrix as cavity infilling and matrix grains No Recovery 129.9-131.0' Limestone 131.0-133.4' - yellowish gray, (5Y 8/1), very weak (R1), 30-40% voids/casts <1/16", trace cavities 3/16"x1/16", friable, highly fossiliferous (casts, molds, shells), very fine grain sized limestone, all carbonate 133.4-134.8' - yellowish gray, (5Y 8/1), very fine to medium grained, (grain size coarsening with depth), thin bedded, medium-sized rounded particles of different colors bedded from 133.5-134.8, carbonate materials No Recovery 134.8-136.0'	R18: 5 minutes	
131.0			NR	3	131.1' - Bedding plane, horizontal, rough, undulating, open 1/8" 131.25, 131.30' - Bedding plane (2), horizontal, rough, undulating, open 1/4"		All material is carbonate; larger (1/2"x1/8") shells appear to be bedded at approximate 20°-30° dip over 132.0-133.4' interval SC-6 collected at 131.3-132.55'	
135 -92.6	R19-NQ 5 ft 76%	47	1	3	132.55' - Fracture or mechanical break, horizontal, rough, undulating, tight 133.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 133.5, 133.6, 133.7' - Bedding plane (3), horizontal, rough, planar, open <1/16" 134.05' - Bedding plane, horizontal, rough, undulating, tight	134.1' - Bedding plane, horizontal, rough, undulating, open 1/8" 134.2, 134.4, 134.5' - Bedding plane (3), horizontal, rough, undulating, open 1/8" 136.1, 137.1' - Bedding plane or mechanical break (2), 5-10 deg, rough, undulating, tight 136.3' - Bedding plane or mechanical break, horizontal, rough, planar, tight 137.85, 137.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight 138.1' - Fracture, 70 deg 138.9' - Fracture, 15-20 deg 139.3' - Bedding plane, 5 deg, rough, undulating 139.3-140.0' - Fracture, angular stained black along fracture surfaces	R19: 6 minutes	
136.0			NR	2	136.3' - Bedding plane or mechanical break, horizontal, rough, planar, tight 137.85, 137.95' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight		SC-7 collected at 136.3-137.1'	
140 -97.6	R20-NQ 5 ft 80%	58	2	>10	138.1' - Fracture, 70 deg 138.9' - Fracture, 15-20 deg 139.3' - Bedding plane, 5 deg, rough, undulating	No Recovery 134.8-136.0'	R20: 8 minutes	
141.0			NR	NR	139.3-140.0' - Fracture, angular stained black along fracture surfaces			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.6	R21-NQ 5 ft 92%	60	3	141.2' - Bedding plane or mechanical break, 15-20 deg, rough, undulating, open fractured through cavity	Limestone 136.0-139.3' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak (R1), very fine grain rock with medium grained beds at 136.0', 138.0-138.3', very weak (R1), highly fossiliferous (microforams, shells, casts, molds), 5-7% medium sized, medium dark gray (N4) medium sized grain, subrounded, 5-10% voids <1/16", 10% mottling in yellowish gray (5Y 7/2) powder-like texture Limestone 139.3-140.0' - yellowish gray, (5Y 8/1), very fine grained, medium strong to strong (R3 to R4), 3-5% voids <1/16", poorly fossiliferous (casts, molds), interval has broken fragments of core with irregular shaped infilled cavities (bioturbated zones), infilling with grayish yellow (5Y 8/4), hard, brittle minerals with 30-40% voids <1/16" No Recovery 140.0-141.0' Limestone 141.0-145.05' - very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), 5-15% voids <1/16", 15-20% horizontally aligned, irregularly shaped to elongated cavities 3/16" x 1/16", few bedding contacts with brownish black (5YR 2/1) laminations on surface, trace dissolution cavities 3/4", poorly fossiliferous (casts/molds), dense heft 145.05-145.6' - light olive brown, (5Y 5/6), strong HCl reaction, weak (R2), 3-5% moderate dark gray (N4) rounded grains, fine to medium grained, trace voids <1/8" No Recovery 145.6-146.0' Limestone 146.0-148.9' - yellowish gray grading to light olive brown, (5Y 8/1 grading to 5Y 5/6), medium grained, strong HCl reaction, very weak (R1), with gritty feel, bedded medium sized carbonate grains (yellowish gray, light olive brown, moderate yellow), particle sizes decreasing with depth, angular to subrounded, medium light gray (N6) coarse sand to fine gravel-sized grains over top 0.7' interval	R21: 10 minutes	
146.0			2	141.6, 141.9, 142.25' - Mechanical break or fracture (3), horizontal, rough, undulating, tight, fractured through irregularly shaped dissolution cavities, 15% brown or black staining on fracture surface			
			3	142.8' - Bedding plane, 10 deg, rough, undulating, black stains over 10% of surface, open 1/16"			
			1	143.1' - Bedding plane, 15-20 deg, brownish black stains over 85% of surface, tight			
			3	143.25' - Bedding plane, horizontal, rough, undulating, open 1/8"			
			NR	143.9' - Bedding plane, horizontal, rough, stepped			
150 -107.6	R22-NQ 5 ft 92%	77	1	144.25' - Fracture, 25 deg, rough, undulating, tight		R22: 9 minutes	
			2	145.05' - Bedding plane, horizontal, rough, undulating, tight			
			1	145.35' - Bedding plane, horizontal, rough, undulating, open 1/16"			
			2	145.5' - Fracture, 80 deg, rough, undulating, tight			
			1	146.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1"			
			NR	147.35, 147.75' - Bedding plane or mechanical break (2), horizontal, rough, undulating			
				148.2, 148.5' - Mechanical break (2), tight	Abandonment: approximately 250 gallons of grout mix (28-47 lb bags of Bonsal brand Portland Type 1 cement), 7 dry 47 lb bags added to top of grouting surface (35-47 lb bags of grout mix used)		
				148.9' - Bedding plane, horizontal, rough, undulating, tight			
				149.15' - Fracture, vertical, rough, undulating, tight			
				149.8' - Fracture, 40-50 deg, rough, undulating, tight			
				150.3' - Fracture or mechanical break, horizontal, rough, undulating, tight, fractured through partially infilled cavity			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/20/07 START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					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 5/22/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 1 OF 9
SOIL BORING 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
 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 : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
42.9	0.0	1.1	SS-1	1-1-2 (3)	Poorly Graded Sand With Organics (SP) 0.0-1.1' - dark gray to very light gray, (N3 to N8), moist, very loose, fine grained sands, trace nonplastic fines that are primarily organic, trace roots, decreasing with depth, silica sand		Wet at 3.0' below ground surface (SS-1 dry but SS-2 wet)
	1.5						
5 37.9	5.0	1.0	SS-2	3-1-2 (3)	Clayey Sand (SC) 5.0-6.0' - dark yellowish brown, (10YR 6/6), brownish black mottling, moist to wet, very loose, fine grained sand, 14% medium plastic fines, 5% concretions up to 1/2" in size, silica sand		
	6.5						
10 32.9	10.0	0.9	SS-3	5-4-6 (10)	Silt (ML) 10.0-10.9' - grayish yellow, (5Y 8/4), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCl reaction, trace fine grained sand, trace concretions, carbonate derived		
	11.5						
15 27.9	15.0	0.9	SS-4	11-2-2 (4)	Silt (ML) 15.0-15.9' - Same as 10.0-10.9' except trace brown-black mottling, soft, trace fine white grained sand, fine to coarse grained sand, carbonate derived		Driller's Remark: Some loss circulation after pulling split spoon
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 2 OF 9
SOIL BORING 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
 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 : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
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 coarse grained gravel-sized concretions, dark yellowish orange staining, fine grained sands, also a single limestone fragment, silica sand		Driller's Remark: 4" HW casing advanced to 23.0' Driller's Remark: Circulation loss Last SPT of 5/1/07
25 17.9	25.0	1.2	SS-6	25-37-42 (79)	Silty Sand With Limestone Fragments (SM) 25.0-26.2' - grayish yellow, (5Y 8/4), wet, very dense, moderate HCl reaction, fine to coarse grained sand-sized, 41% nonplastic fines, 15% fine grained gravel-sized limestone fragments, trace white carbonate streaks, trace black with green very fine grained sand, all carbonate derived		SS-6 is first run of 5/2/07, 08:03 water level = +0.8'
30 12.9	30.0	1.3	SS-7	27-31-29 (60)	Silty Sand (SM) 30.0-31.3' - Same as 25.0-26.2' except 30-35% nonplastic fines and 10-15% fine sized limestone fragments		
35 7.9	35.0	1.5	SS-8	29-40-19 (59)	Silty Sand With Limestone Fragments (SM) 35.0-36.5' - Same as 25.0-26.2' except 20% sized limestone fragments		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 3 OF 9
SOIL BORING 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
 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 : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	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
2.9	40.0	1.5	SS-9	20-40-46 (86)	Sandy Silt (ML) 40.0-41.5' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 33% fine to medium grained sand, all carbonate		
	41.5						
45	45.0	1.5	SS-10	16-22-36 (58)	Sandy Silt (ML) 45.0-46.5' - Same as 40.0-41.5'		
-2.1	46.5						
50	50.0	0.0	SS-11	50/4 (50/4")	No Recovery 50.0-50.3'		
-7.1	50.3						
55	55.0	0.1	SS-12	50/5 (50/5")	Limestone Fragments 55.0-55.1' - grayish yellow, (5Y 8/4), moderate HCl reaction, fine to coarse grained sand and fine sized limestone fragments		
-12.1	55.4						
60							Driller's Remark: Last 2.0' were harder drilling, light chatter



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 4 OF 9
SOIL BORING 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
 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 : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)						DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.1	60.0	0.1	SS-13	50/4 (50/4")	Limestone Fragments 60.0-60.1' - grayish yellow, (5Y 8/4), mild to moderate HCl reaction Begin Rock Coring at 61.0 ft bgs See the next sheet for the rock core log		Last SPT sample, switching to NQ coring Driller's Remark: 4" HW casing advanced to 60.0'
65 -22.1							
70 -27.1							
75 -32.1							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
61.0	R1-NQ 5 ft 66%	8	4	61.25, 61.55' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16", shell casts on fracture surface	[Symbolic Log]	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'	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	
65			6	61.7' - Fracture, 50 deg, rough, undulating, tight				
-22.1			3	61.95' - Fracture, 80 deg, rough, undulating, black staining in microfractures on surface				
66.0			1	62.1, 62.25' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/8" open				
			NR	62.5' - Fracture, 50 to 60 deg, rough, undulating, tight			R1: 3 minutes	
	R2-NQ 5 ft 100%	92	2	62.6' - Mechanical break or fracture, horizontal, rough, undulating, tight	[Symbolic Log]	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	SC-1 collected at 68.75-69.65' R2: 11 minutes	
			2	62.7' - Fracture, 50 to 60 deg, rough, undulating, tight				
			2	62.9' - Fracture, horizontal, rough, planar, tight				
			2	63.1' - Fracture or mechanical break, horizontal, rough, undulating, open to 3/4"				
			2	63.5, 63.75' - Fractures or mechanical break (2), horizontal, rough, undulating, dark grayish staining, open 1/16"				
			1	64.0' - Fracture or mechanical break, 30 deg, rough, undulating, dark grayish staining on surface, tight				
70			0	66.1, 66.3' - Mechanical break or fractures (2), horizontal, rough, undulating, open up to 1/2"			R2: 11 minutes	
-27.1	R3-NQ 5 ft 84%	75	2	67.15' - Fracture, 50 deg, rough, planar, dark staining over 80% of surface, tight	[Symbolic Log]	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 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'	Driller's Remark: Slight (20%) loss of circulation over first foot of run R3: 7 minutes	
			0	67.95' - Fracture, 10 to 20 deg, smooth, stepped, tight				
			0	68.5' - Mechanical break, 10 to 20 deg, rough, undulating, mechanical break to get into box, tight				
			0	68.75, 68.85' - Mechanical break or bedding plane (2), 10 to 20 deg, rough, undulating, open 1/16"				
			1	69.65' - Mechanical break or bedding plane, horizontal, rough, undulating				
			NR	71.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/4"				
75			NR	71.65' - Bedding plane, horizontal, rough, undulating, open to 1/2" contact between 2 colors, infilled voids and soft plastic fines on surface above			Driller's Remark: Loss of core interval from 76.65-78.5'	
-32.1	R4-NQ 5 ft 62%	43	2	74.85' - Mechanical break or bedding plane, horizontal, rough, undulating, tight	[Symbolic Log]	Limestone 76.0-76.65' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak (R1), voids (<1/16") over 5-10% of surface No Recovery 76.65-78.55'	Driller's Remark: Loss of circulation at approximately 78' (100%) SC-2 collected at 79.8-81.0' R4: 25 minutes	
			NR	76.2' - Mechanical break or fracture, horizontal, rough, planar, open 1/16"				
			1	76.4' - Fracture or mechanical break, 30 deg, rough, undulating				
			3	76.65' - Fracture, horizontal, rough, undulating				
			0	78.5' - Fracture, horizontal, rough, undulating				
80			0	79.0, 79.25' - Fractures (2), horizontal, rough, undulating, top and base of crumbled rock fragments, tight			SC-2 collected at 79.8-81.0' R4: 25 minutes	
-37.1								
81.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 6 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 ORIENTATION : Vertical

WATER LEVELS : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -42.1	R5-NQ 5 ft 100%	86	1	79.8' - Bedding plane or mechanical break, horizontal, rough, planar, open <1/16"	[Symbolic Log]	Limestone 78.55-81.0' - medium yellow, (5Y 7/6), very fine grained, strong HCl reaction, weak to strong (R2 to R4), voids (<1/16") over 25-30% of surface, trace unfilled cavities, irregularly shaped, poorly fossiliferous (casts) 81.0-85.4' - yellowish gray, (5Y 8/1), white mottled, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (molds, casts) 1" long tubular molds 1/16" diameter, voids (<1/16") over 30-35% of surface, 83.3-84.0' very fine grained "chalk-like" textured layer, below 84.0' highly mottled in bioturbated pockets 85.4-86.0' - olive gray, (5Y 4/1), laminations 1/4" thick of a very fine grained soft fine material 86.0-91.0' - yellowish gray, (5Y 8/1), very fine grained, strong to moderate HCl reaction, weak (R2) 86.0-86.4' - light olive brown (5Y 5/6) bioturbated pockets with voids (<1/16") 86.4-86.7' - very fine grained "chalk-like" textured limestone bed 86.7-90.0' - very fine grained weak (R2) rock, voids or casts (<1/16") over 10-15% of surface, grades to highly fossiliferous medium grained textured limestone, 20-25% white fossil allochems in rock matrix with 30-35% medium gray grains 89.5' - organic clay lens, light olive brown (5Y 5/6) 90.0-91.0' - 30-40% yellowish gray (5Y 7/2) grains in matrix, organic (black) laminations with 3/8" sized grains (black in color) 91.0-95.9' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2) 91.0-93.2' - stained yellowish gray (5Y 7/2), highly fossiliferous (casts, molds up to 3/4"), voids/casts (<1/8) over 20-25% of surface, 10-15% fine to medium grained sized medium dark gray (N4) grains in rock matrix No Recovery 95.9-96.0 Limestone 96.0-101.0' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), chalk-like texture, highly fossiliferous (casts, spiral-shaped up to 5/8" and molds), voids or casts (<1/16") over 25-30% of surface, trace black grains (organics)	R5: 14 minutes
			2	81.5' - Mechanical break, 50 to 60 deg, rough, undulating, tight			
			3	81.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
			0	82.8, 82.9, 83.05' - Bedding plane or mechanical break (3), 30 deg, rough, undulating, tight, fossil casts (up to 1 1/2" size) and molds (of tubular fossils) on surfaces			
			1	83.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1"			
	90 -47.1	R6-NQ 5 ft 100%	86	1			83.5' - Mechanical break, mechanical break to get into box
				2			83.7' - Bedding plane or mechanical break, horizontal, rough, undulating, slight darker discoloration/staining
				1			84.2' - Mechanical break, 10 deg, rough, undulating, tight
				0			85.4' - Bedding plane, 0 to 5 deg, rough, undulating, soft fine material infill 1/16" thick
				1			86.2, 86.7' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/8"
2				87.2' - Mechanical break or bedding plane, horizontal, smooth, planar			
95 -52.1	R7-NQ 5 ft 98%	82	2	87.4' - Fracture, vertical, rough, undulating, black stains over 10-15% of surface			
			3	89.25' - Bedding plane, 70 deg, 3/4" thick soft fine infill (olive gray 5Y 3/2)			
			0	90.0' - Fracture, 70 deg, rough, undulating, light gray staining over 100% of surface, tight			
			0	90.45' - Fracture, 30 deg, rough, undulating, tight			
			1	91.1, 91.5' - Mechanical break or bedding plane (2), horizontal, rough, undulating, open 1/16"			
			1	91.9' - Mechanical break or bedding plane, horizontal, rough, undulating, open up to 1/2", fossils on surface of break			
			3	92.6, 93.65' - Mechanical break (2), horizontal, rough, undulating, tight			
100 -57.1	R8-NQ 5 ft 100%	86	NR	94.4' - Mechanical break or bedding plane, horizontal, rough, undulating, tight			
			1	95.25' - Mechanical break or bedding plane, horizontal, rough, planar, shell casts on fracture surface, open 1/16"			
			0	95.55' - Mechanical break or bedding plane, horizontal, rough, undulating, tight, fossil cast on surface			
			1	95.65' - Mechanical break or fracture, 30 deg, rough, undulating, open 3/8"-1/4"			
			0	96.3' - Fracture or mechanical break, 30 deg, rough, undulating, tight to open 3/4"			
2	98.2' - Fracture or mechanical break, horizontal, rough, undulating, gray staining						
				100.25' - Mechanical break, horizontal, rough, undulating, light gray staining, tight		R8: 4 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -82.1	R13-NQ 5 ft 98%	98	1	121.35' - Fracture, 70 deg, rough, undulating, tight	Limestone 116.0-119.5' - fine grained, strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (microforams, molds/casts), grades in color from light gray (N7) from 116.0-118.0' to medium gray (N5) from 118.0-119.5', similar sequence to 111.0-116.0', becoming friable, voids and fossils increase in percentage with depth, 5-10% cavities with white (N9) and translucent mineral replacement, cavities are elongated 5/8"x3/8", translucent to clear crystal grains (calcite) (1/32"-1/16"), voids (<1/16") over 35-45% of surface No Recovery 119.5-121.0' Limestone 121.0-125.9' - yellowish gray to light gray, then to medium light gray at 125.0', (5Y 8/1 to N7 to N6), fine grained, strong HCl reaction, very weak (R1), voids/microforams casts (<1/16") over 30-35% of surface, highly fossiliferous (casts, molds, 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' 124.9-125.9' - possible calcite crystals No Recovery 125.9-126.0' Limestone 126.0-128.6' - medium gray to yellowish gray, (N5 to 5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), inverse sequence of 106.0-111.0', grades from friable/gritty to powder-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'	R13: 2 minutes	
			2	122.05, 122.1' - Bedding plane or mechanical break (2), 5 to 10 deg, rough, undulating, black speckling as stains on 25% of surface, tight			
			1	123.15, 123.4' - Mechanical break (2), mechanical break to get in to box			
			1	123.55' - Fracture, 60 to 70 deg, rough, undulating, tight			
			0	124.4, 124.65' - Mechanical break, horizontal, rough, undulating, broken by driller, tight			
			NR	124.9' - Fracture, 80 deg, rough, undulating, black speckled staining over 60% of surface, tight			
			>10	125.05' - Mechanical break, <5 deg, rough, undulating, black stains, tight			
			1	126.15-126.45' - Fracture zone, subangular and subrounded limestone fragments 3/4"-1-1/8" in size			
			3	127.85' - Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 7/8"			
			NR	128.0' - Fracture or mechanical break, horizontal, rough, planar, tight 128.5' - Fracture or mechanical break, horizontal, smooth, planar, tight			
130 -87.1	R14-NQ 5 ft 52%	22	3	129.3, 129.4' - Mechanical break or fracture (2), horizontal, rough, undulating, open <1/8"	R14: 3 minutes		
			1	131.75' - Mechanical break or fault, horizontal, rough, planar, tight			
			0	132.3' - Fracture, 25 deg, rough, undulating, tight			
			2	133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get in to box, tight			
			0	134.55' - Fracture or mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16"			
			NR	134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16"			
135 -92.1	R15-NQ 5 ft 90%	80	1	136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1"	CS-5 collected at 132.3-133.5'		
			2	137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8"			
			2	137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight			
			NR	138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight			
140 -97.1	R16-NQ 5 ft 50%	36			R15: 3 minutes		
					R16: 6 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 9 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.1	R17-NQ 5 ft 86%	60	2 1 3 5 0	141.55' - Fracture or mechanical break, horizontal, rough, undulating, 1/2" open 141.85' - Bedding plane or mechanical break, 85 deg, smooth, undulating, open 1/16" 142.25, 143.1, 143.45, 143.8' - Fractures (4), 20 to 60 deg, rough, undulating, tight 144.2' - Fracture or mechanical break, 10 deg, rough, undulating, tight 144.55, 144.65, 144.8, 144.95' - Mechanical break or fractures (4), 0 to 10 deg, smooth, undulating, open <1/16"		Limestone 131.0-135.5' - yellowish gray, (5Y 8/1), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 10-15% of surface, chalk-like/powdery feel to sample, 5-10% coverage of 3/4"x3/16" cavities rimmed with white (N9) mineralization, 134.75' contact (sharp) very fine grained whitish limestone below, medium gray (N6) discoloration as horizontal bands at 132.0', moderately to highly fossiliferous (casts, molds) No Recovery 135.5-136.0' Limestone 136.0-138.5' - very light gray to medium light gray, (N8 to N6), strong HCl reaction, weak to medium strong (R2 to R3) 136.0-137.25' - cavities up to 1-3/4" infilled partially and entirely with very fine grained yellowish gray (5Y 8/1) material, cavities have tubular casts 1/8" diameter, trace elongate shaped cavities 3/4"x3/16" rimmed with white (N9) mineralization (possibly echinoderms with calcite replacement)	Driller's Remark: Probable jostling of rock fragments during coring R17: 16 minutes
150 -107.1	R18-NQ 5 ft 84%	78	1 1 1 2 0 NR	146.8' - Fracture, 50 deg, rough, undulating, tight 147.1' - Bedding plane or mechanical break, horizontal, rough, planar, tight 147.6' - Mechanical break, horizontal, rough, undulating, tight 148.25' - Mechanical break, horizontal, rough, undulating, tight 148.5' - Fracture or mechanical break, rough, undulating, 15% black speckled staining, tight 149.35-149.6' - Mechanical break or bedding plane, 5 to 10 deg, rough, undulating, open <1/16"		No Recovery 138.5-141.0' Limestone 137.25-138.5' - yellowish gray (5Y 8/1), very fine grained, moderate to strong HCl reaction, medium strong (R3), bioturbated areas with voids <1/16" over 30-40% of infill, poorly to moderately fossiliferous (casts, molds) No Recovery 138.5-141.0' Limestone 141.0-145.3' - yellowish gray, (5Y 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 141.7' - with 3-5% medium to coarse grained medium gray (N5) grains, horizontally to subhorizontally aligned, poorly fossiliferous (shells, molds, echinoderms) No Recovery 145.3-146.0'	R18: 8 minutes



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-09	SHEET 10 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 ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/3/07 START : 5/1/2007 END : 5/3/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					Limestone 146.0-150.2' - yellowish gray, (5Y 7/2), strong HCl reaction, weak (R2) to medium strong (R3) rock, voids (<1/16") over 10-15% of surface, poorly fossiliferous (casts, molds, some echinoderms), medium grained intervals have barely visible distinct grain colors, yellowish gray (5Y 7/2) and light gray (N6), fine grained intervals are yellowish gray (5Y 8/1) in color and have voids (<1/16") over 20% of surface, trace infilled cavities up to 1/4" diameter 149.6-150.2' - horizontal bedding No Recovery 150.2-151.0' Bottom of Boring at 151.0 ft bgs on 5/3/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 4/7/07 START : 4/6/2007 END : 4/9/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.0	0.0	0.8	SS-1	2-3-5 (8)	Topsoil 0.0-0.25' - brownish black to light brown, (5YR 2/1 to 5YR 5/6), moist, root matter, wood fragments, and organics, with fine silica sand Poorly Graded Sand With Silt (SP) 0.25-0.8' - brownish gray, (5YR 4/1), moist, loose, very fine grained, silica sand, 5% nonplastic fines, trace organics		Cathead Operator: F. Cani Driller's Remark: Rapid, smooth drilling Water level between 1.5-3.0' below ground surface Driller's Remark: Light chatter
5 37.0	5.0	1.2	SS-2	4-4-3 (7)	Sandy Lean Clay (CL) 5.0-6.2' - light gray, (N7), moist, medium stiff, medium plasticity, slow dilatancy, no HCl reaction, 30% very fine silica sand		
10 32.0	10.0	1.2	SS-3	4-22-22 (44)	Clayey Sand (SC) 10.0-10.5' - transitions from black to yellowish gray, (N1 to 5Y 8/1), moist to wet, soft, high plasticity, no to slow dilatancy, strong HCl reaction, <5% fine to medium grained carbonate sand Silt (ML) 10.5-11.2' - grayish orange, (10YR 7/4), dry to moist, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 10% medium sand-sized, trace fine gravel-sized limestone fragments, all carbonate material		
15 27.0	15.0	1.0	SS-4	5-15-19 (34)	Silt (ML) 15.0-16.0' - Same as 10.5-11.2' except coarse gravel-sized limestone fragments (1") at top of interval, no sand-sized material		Driller's Remark: Light chatter, variable at 15-20', drill rate slowing
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 4/7/07 START : 4/6/2007 END : 4/9/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.0	20.8 20.8	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 sand-sized material		Driller's Remark: Slow advancement rate at 22-30', intermittent to constant heavy chatter, strong H2S odor from mud at 22-24'
25 17.0	25.0	1.0	SS-6	23-30-30 (60)	Sandy Silt With Limestone Fragments (ML) 25.0-26.0' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 25-30% fine to coarse sand-sized, weak (R2) limestone lenses (<1/2" thick) throughout, all carbonate material		Driller's Remark: 100% loss of circulation at 24' Driller's Remark: Partial to full circulation return with use of thicker mud
30 12.0	30.0	1.2	SS-7	11-24-30 (54)	Sandy Silt (ML) 30.0-31.2' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 30% very fine to fine sand-sized material, very weak (R1) limestone lens (1/2" thick) at 30.0', trace organics, all carbonate material		Driller's Remark: Moderate drilling rate at 30-45', intermittent light to moderate chatter
35 7.0	35.0	1.5	SS-8	9-12-5 (17)	Silty Sand (SM) 35.0-36.5' - moderate yellowish brown, (10YR 5/4), moist to wet, very stiff, fine to medium grained, moderate HCl reaction, 40% nonplastic fines, interbedded (>5) extremely weak (R0) limestone lenses (<1" thick), all carbonate material		
40	36.5						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 3 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
 WATER LEVELS : 2.0 ft bgs on 4/7/07 START : 4/6/2007 END : 4/9/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
2.0	40.0	0.1	SS-9	50/4 (50/4")	Limestone Fragments 40.0-40.1' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, medium to coarse sand-sized and fine gravel-sized fragments		Driller's Remark: Light to heavy chatter at 40-45', very dense, slow drilling rate
45	45.0						18:30 on 4/6/07 End drilling for the day at 49', water at ground surface
-3.0		1.4	SS-10	17-29-31 (60)	Sandy Silt With Limestone Fragments (ML) 45.0-46.4' - moderate yellowish brown, (10YR 5/4), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 35-40% fine to coarse sand-sized, extremely weak (R0) limestone lenses (<1/2" thick) interbedded throughout sample, all carbonate material		08:00 on 4/7/07 Resume drilling from 49' Water level at 2' below ground surface Driller's Remark: Moderately slow drilling rate at 45-60', intermittent light chatter
50	50.0						
-8.0		1.3	SS-11	37-29-15 (44)	Sandy Silt With Limestone Fragments (ML) 50.0-51.3' - Same as 45.0-46.4'		
55	55.0						
-13.0	55.4	0.4	SS-12	50/5 (50/5")	Limestone Fragments 55.0-55.4' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, extremely weak (R0) limestone lenses (<1/2" thick) interbedded with silt-sized material, all carbonate material		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 4 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
 WATER LEVELS : 2.0 ft bgs on 4/7/07 START : 4/6/2007 END : 4/9/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-18.0	60.0	0.6	SS-13	22-50/0.75 (77/6.75")	Sandy Silt (ML) 60.0-60.6' - moderate yellowish brown, (10YR 5/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 25% medium to coarse sand-sized and 5% fine to coarse gravel-sized material, all carbonate material, trace organic laminations Begin Rock Coring at 61.0 ft bgs See the next sheet for the rock core log	11:00 on 4/7/07 Set HW casing to 60.5' to begin NQ rock coring	
65 -23.0	60.6						
70 -28.0							
75 -33.0							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 5 OF 9
ROCK CORE 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

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
61.0 61.5	R1-NQ 0.5 ft 60%	0	2		Limestone 61.0-61.3' - dark yellowish brown, (10YR 4/2), fine grained, strong HCl reaction, weak (R2), 15% laminated organics decreasing with depth, trace voids (<3/16") over surface, poorly fossiliferous No Recovery 61.3-61.5' 62.5-64.3' - Same as 61.0-62.5' except extremely weak to very weak (R0 to R1), 10% laminated organics, poorly fossiliferous, trace voids (3/16"), few cavities (<1/2") 64.3-66.3' - Same as 61.0-62.5'	Begin rock coring at 61.0' R1: 1 minute	
65 -23.0	R2-NQ 5 ft 100%	68	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" 63.25' - Mechanical break 63.75' - Fracture, 30 deg, rough, undulating, open 1/4" 64.0' - Mechanical break 64.3' - Fracture, 20 deg, rough, undulating, open 1/4" 64.45' - Fracture, vertical, rough, undulating, tight	SC-1 collected from 62.2-63.25'
66.5			0				
70 -28.0	R3-NQ 5 ft 78%	66	3		Silt And Limestone Fragments (ML) 66.3-66.5' - dark yellowish brown, (10YR 4/2), moderate to strong HCl reaction, with extremely weak (R0) limestone and trace organics Limestone 66.5-66.7' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), very fine to fine grained, extremely weak (R0), with silt, trace cavities (<1/2"), poorly fossiliferous 66.7-68.85' - Same as 66.5-66.7' except medium strong (R3), voids (<1/16") over 60-80% of surface, moderately fossiliferous with fossil casts (<1/2") and many cavities (<1/2") 68.85-70.4' - Same as 66.5-66.7' except moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (<1/16") over 30-50% of surface, trace cavities (1/2"), poorly fossiliferous No Recovery 70.4-71.5' Limestone 71.5-72.45' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 30-40% of surface, few cavities (<1/2"), moderately fossiliferous 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 (<3/4") 73.75-75.1' - Same as 71.5-72.45' except medium strong (R3), mottled with very light gray (N8), voids (<3/16") over 30-60% of surface, trace organics, many cavities <1/8"	R2: 10 minutes	
71.5			4				Driller's Remark: 50% water loss at 66.5'
75 -33.0	R4-NQ 5 ft 97%	70	1			R3: 3 minutes	
76.5			1				
80 -38.0	R5-NQ 5 ft 68%	54	2			SC-2 collected from 75.1-76.35' R4: 15 minutes	
			1				
			0				
			3				
			1				
			NR			R5: 21 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 6 OF 9
ROCK CORE 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
81.5	R6-NQ 5 ft 74%		5	81.5-82.0' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2") fragments	75.1-76.35' - Same as 73.75-75.1' except very light gray, (N8), medium strong to strong (R3 to R4), voids (<1/16") over 20% of surface, elongate cavities (<2"x1") with secondary, dark yellowish brown (10YR 4/2) infill No Recovery 76.35-76.5' Limestone 76.5-79.9' - very light gray transitioning to dark yellowish brown with depth, (N8 to 10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), voids (<3/16") over 10-50% of surface increasing with depth, few cavities (<1/2") with trace secondary infill, trace organic laminae, extremely weak rock (R0) lens (1/2" thick) at 76.65' No Recovery 79.9-81.5' Limestone 81.5-85.2' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 6/1), very fine to fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 50% of surface with 20% very fine infill, elongate cavities (<2"x1") over 40% of surface, 80% of cavities with pale yellowish brown (10YR 6/1) weak to medium strong (R1 to R3) secondary infill, poorly fossiliferous No Recovery 85.2-86.5' Limestone 86.5-89.9' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 25-40% of surface, few elongate cavities (<1/2"x1/4"), transition from poor to moderately fossiliferous with depth, molds (<1/4"), trace laminations at 86.9-87.4', very weak (R0) lenses from 87.1-87.35' and 89.4-89.5' No Recovery 89.9-92.8' Limestone 92.8-95.6' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, mild HCl reaction, weak to medium strong (R2 to R3), very weak (R1) from 93.6-93.9', voids (<3/16") over 40-60% of surface, few cavities (<2"x1"), light gray (N8) medium strong (R3) secondary infill, moderately fossiliferous, trace organics	16:30 on 4/7/07 End drilling for the day at 81.5', water level at ground surface 07:30 on 04/09/07 Resume drilling, water level at 1.0' below ground surface	
		0	82.95, 84.0' - Mechanical break (2)				
		1	84.4' - Bedding plane or mechanical break, rough, undulating, open 1/2"				
85 -43.0		62	0				
		NR					
86.5	R7-NQ 5 ft 68%		0	87.3, 89.0' - Mechanical break (2)		Driller's Remark: Core barrel locked in formation at 85', advance NW casing from 0.0-80' R6: 20 minutes SC-3 collected from 86.5-87.3'	
			>10	88.05-88.4', 89.4-89.5' - Fracture zone, rough, undulating, angular gravel-sized (<2") fragments			
			>10	88.6' - Fracture or mechanical break, rough, undulating, open <1")			
90 -48.0		46	1	89.6' - Fracture or mechanical break, rough, undulating, tight			
		NR					
91.5	R8-NQ 5 ft 74%		NR			R7: 19 minutes	
			>10	92.8-93.1' - Fracture zone, rough, undulating, angular gravel-sized (<1") fragments			
			1	93.2' - Fracture or mechanical break, <10 deg, rough, undulating, tight			
95 -53.0		54	0	93.85' - Fracture or mechanical break, 30 deg, rough, undulating, tight			
			3	94.0, 95.0, 95.55' - Mechanical break (3) 95.15, 96.2, 96.25' - Fractures or mechanical break (3), smooth to rough, undulating, tight to open <1/8"			
96.5	R9-NQ 5 ft 95%		>10	97.0-97.1' - Fracture zone, rough, undulating, angular gravel-sized (1"-1-1/2") fragments		Driller's Remark: Core loss (91.5-92.8') due to core barrel blockage	
			>10	97.45-97.65' - Fracture zone or bedding plane, rough, undulating, open <1/2"			
			5-10	98.65, 98.9' - Fracture zone or mechanical break (2), 35 deg, rough, undulating, tight to open 1/4"			
100 -58.0		64	>10	99.15' - Fractures (2), vertical, rough, undulating, tight			
			0	99.35' - Bedding plane, rough, undulating, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 7 OF 9
ROCK CORE 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -63.0	101.5	95	NR	99.75-100.0' - Fracture zone, rough, undulating, angular gravel-sized (<2") fragments	[Symbolic Log]	95.6-96.5' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace voids (<3/16"), poorly fossiliferous, few molds (<1/2" diameter) 96.5-98.2' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), extremely weak to very weak (R0-R1) from 97.0-97.5', trace voids (<3/16"), trace bioturbation 98.2-100.0' - Same as 96.5-98.2' except voids (<3/16") over 30-40% of surface, moderately to highly fossiliferous with molds (<1/2"), <20% organic laminations concentrated in extremely weak (R0) rock from 98.9-99.2' 100.0-101.25' - Same as 98.2-100.0' except moderately fossiliferous, few cavities (<1") with secondary infill, trace organics No Recovery 101.25-101.5' Limestone 101.5-106.5' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 20-40% of surface, few cavities (<1"x1/2") with secondary infill, moderately to highly fossiliferous with elongate molds and casts (<1x1/2"), trace organics 106.5-111.5' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), moderate yellowish brown (10YR 5/4) from 107.1-108.0', extremely weak (R0) from 107.75-108.3', voids (<3/16") over 30% of surface, laminated bedding from 107.1-108.0', highly fossiliferous with elongate molds, casts (<3/4x1/4") 111.5-116.5' - Same as 106.5-111.5' except strong HCl reaction, voids over 10-30% of surface, poorly fossiliferous with molds at 116.0-116.5' 116.5-121.3' - Same as 111.5-116.5' except fossil molds concentrated from 120.25-121.3'	R10: 13 minutes
			1	101.65' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to open 1/8"			
	0						
	0	104.0, 105.2' - Mechanical break (2)					
	0						
	1						
	106.5		106.4' - Fracture, 65 deg, rough, undulating, tight to open <1/4"				
	0	107.5, 109.0, 110.3' - Mechanical break (3)					
	0						
	0						
110 -68.0	111.5	100	>10	111.65-113.95' - Bedding plane or fracture (17), <10 deg, smooth to rough, planar to undulating, tight to open <1-1/2"	[Symbolic Log]	SC-4 collected from 113.1-113.9'	
			6				
	1						
	1	114.8' - Fracture, 45-50 deg, rough, undulating, tight					
	0						
	116.5		116.5-116.7' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2") fragments				
	>10	117.1' - Fracture, vertical, rough, undulating, open 1", runs from 116.7' to 117.6'					
	>10	117.6-117.8' - Fracture zone, rough, undulating, angular gravel-sized (<2") fragments					
	>10	118.0' - Fracture, vertical, rough, undulating, open <1"					
	>10	118.85-119.1' - Fractures (3), vertical, rough, undulating, open <1/2"					
115 -73.0	R10-NQ 5 ft 100%	95			[Symbolic Log]	R11: 18 minutes	
120 -78.0	R11-NQ 5 ft 100%	100			[Symbolic Log]	R12: 11 minutes	
120 -78.0	R12-NQ 5 ft 100%	68			[Symbolic Log]	R13: 6 minutes	
120 -78.0	R13-NQ 5 ft 96%	64			[Symbolic Log]		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-10	SHEET 8 OF 9
ROCK CORE 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

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
125 -83.0	R14-NQ 5 ft 100%	100	0 NR 0 1 1 1 0		<p>No 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 125.2-125.4'</p>	R14: 10 minutes	
130 -88.0	R15-NQ 5 ft 99%	93	2 1 0 0 1		<p>126.5-131.45' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids over <10% of surface except from 126.5-127.6' (30%), poorly fossiliferous, becoming yellowish gray (5Y 7/2) at 129.0-129.65'</p>	R15: 5 minutes	
135 -93.0	R16-NQ 5 ft 99%	87	NR 4 0 2 2 0		<p>No Recovery 131.45-131.5' Limestone 131.5-136.45' - yellowish gray, (5Y 5/1), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), light olive gray (5Y 6/1) from 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"), laminated from 132.45-132.65'</p>	SC-5 collected from 133.1-133.9' R16: 6 minutes	
140 -98.0	R17-NQ 5 ft 99%	65	NR >10 >10 1 1		<p>No Recovery 136.45-136.5' Limestone 136.5-141.45' - yellowish gray from 136.5-138.5' and moderate yellowish brown from 138.5-141.45', (5Y 8/1, 10YR 5/4), very fine to fine grained, mild to strong HCl reaction, very weak to weak (R1 to R2), extremely weak (R0) from 138.25-138.35', poorly fossiliferous (fossils up to 1/4"x1/4"), laminated organic layers (4) at intervals 136.6-136.7', 131.0-137.5', 137.8-138.35', and 139.20-139.70'</p>	R17: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 1 OF 9
SOIL BORING 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
 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 : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
42.7	0.0	1.5	SS-1	3-4-5 (9)	Poorly Graded Sand (SP) 0.0-0.2' - pale yellowish brown, (10YR 6/2), dry, loose, road material, fine silica sand Topsoil 0.2-1.5' - brownish black, (5YR 2/1), dry to moist, stiff, 70% organic fines, 30% roots/vegetation		
5	5.0	6.5	SS-2	0-2-4 (6)	Lean Clay (CL) 5.0-5.9' - light olive gray, (5Y 5/2), moist to wet, firm, high plasticity, no dilatancy, 10-15% very fine to fine silica sand		
10	10.0	11.5	SS-3	6-13-16 (29)	Silt (ML) 10.0-11.0' - moderate yellow, (5Y 7/6), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% fine to medium sand-sized, all carbonate		
15	15.9	27.7	SS-4	50/1.5 (50/1.5")	Silt With Limestone Fragments (ML) 15.0-15.1' - grayish yellow, (5Y 8/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% fine to medium sand-sized, all carbonate, limestone lenses 1/4" thick		Driller's Remark: Lost a little circulation
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 2 OF 9
SOIL BORING 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
 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 : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.7	20.0	1.2	SS-5	21-24-11 (35)	Silty Sand (SM) 20.0-21.2' - grayish yellow, (5Y 8/4), moist to wet, dense, mild to moderate HCl reaction, fine to coarse grained, 35% nonplastic fines, trace angular fine gravel-sized, all carbonate		
	21.5						
25	25.0	1.0	SS-6	9-8-6 (14)	Silty Sand (SM) 25.0-26.0' - yellowish gray, (5Y 7/2), wet, medium dense, moderate HCl reaction, fine to coarse grained, 30-40% nonplastic fines, all carbonate		
17.7	26.5						
30	30.0	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, mild to moderate HCl reaction, fine to coarse grained, 20% nonplastic fines, 35-40% fine to coarse gravel-sized limestone, all carbonate		
12.7	30.3						
35	35.0	0.6	SS-8	22-50/3 (72/9")	Silty Sand (SM) 35.0-35.6' - moderate yellow, (5Y 7/6), moist to wet, very dense, strong HCl reaction, fine to coarse grained, 30% nonplastic fines, trace fine gravel, all carbonate		
7.7	35.8						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 3 OF 9
SOIL BORING 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
 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 : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
2.7	40.0	0.3	SS-9	50/3 (50/3")	Limestone Fragments 40.0-40.3' - dusky yellow, (5Y 6/4), strong HCl reaction, coarse sand-sized to fine gravel-sized		
45 -2.3	45.0 45.4	0.4	SS-10	50/5 (50/5")	Silty Sand With Limestone Fragments (SM) 45.0-45.4' - dusky yellow, (5Y 6/4), wet, very dense, strong HCl reaction, fine to coarse grained, 15% nonplastic fines, 40% fine to coarse limestone fragments, all carbonate		
50 -7.3	50.0 50.4	0.3	SS-11	50/5 (50/5")	Limestone Fragments 50.0-50.3' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, fine to coarse sand-sized and fine to coarse gravel-sized Begin Rock Coring at 51.5 ft bgs See the next sheet for the rock core log		Soil sampling completed at 10:55 on 5/19/07
55 -12.3							
60							



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 ORIENTATION : Vertical
 WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
51.5	R1-NQ 5 ft 60%	8	4	51.55-52.3' - Fracture zone, 0-15 deg, rough, undulating, bedding plane fractures or mechanical breaks, up to 3/4" fragments	Limestone 51.5-54.5' - moderate yellowish brown, (10YR 5/4), very fine to coarse grained, strong HCl reaction, weak (R2), 40% coverage of voids 1/16" or less on surface, few cavities <1/2" diameter, trace secondary infill recrystallization No Recovery 54.5-56.5'	Rock coring begins at 11:25 on 5/19/07 Driller's Remark: Soft at 52.0-52.5', 53.0-53.5', 54.5-54.9' R1: 3 minutes	
>10			52.6-54.25' - Fracture zone, rough, undulating to stepped, fine to coarse angular gravel, up to 2" diameter				
>10							
NR							
55 -12.3							
56.5	R2-NQ 5 ft 69%	20	>10	56.5-56.6' - Fracture zone, smooth to rough, undulating, fine to coarse angular gravel	Limestone 56.5-59.95' - pale yellowish brown, (10YR 6/2), very fine to fine grained, strong HCl reaction, weak (R2), 40% coverage of voids 1/16" or less on surface, few cavities some elongate and some spherical, trace spots of black organic material <1/2" diameter No Recovery 59.95-61.5'	R2: 5 minutes	
56.9-57.55' - Fracture zone, smooth to rough, undulating, fine to coarse angular gravel							
57.8' - Mechanical break, 30 deg, rough, undulating, tight to <1/16" open							
58.25' - Bedding plane, 10 deg, smooth, undulating, <1/4" open							
58.4-58.5' - Fracture zone, smooth to rough, undulating, fine to coarse angular gravel							
59.05' - Mechanical break							
59.5' - Mechanical break							
60 -17.3							
61.5	R3-NQ 5 ft 58%	24	1	61.7-61.8' - Fracture zone	Limestone 61.5-64.4' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 0-10% coverage of voids 1/16" or less except 20% coverage of voids up to 1/8" on surface at 61.5-61.8', no visible fossils or cavities except 61.5-61.8' cavities up to 3/8" covering 5% of rock, trace black organic staining No Recovery 64.4-66.5'	R3: 5 minutes Driller's Remark: Soft at 66.0-67.0', 68.0-68.5'	
62.65' - Fracture, horizontal, rough, stepped							
62.9' - Fracture, horizontal, smooth, undulating							
63.1' - Fracture, horizontal, smooth to rough, undulating							
63.2' - Fracture, horizontal, rough, undulating							
63.5-63.6' - Fracture zone							
64.1' - Fracture, 28 deg, rough, stepped							
64.4' - Mechanical break							
65 -22.3							
66.5	R4-NQ 5 ft 66%	37	3	65.9-66.1' - Fracture zone	Limestone 66.5-66.95' - Same as 61.5-64.4' 66.95-67.75' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak (R1), 30% coverage of voids 1/16" or less on surface, trace dark organic inclusions, no visible cavities or fossils	R4: 4 minutes	
67.3, 67.4' - Fractures (2), <10 deg, rough, stepped							
67.6, 67.4, 67.6, 67.9' - Fractures (4), 0-18 deg, rough, undulating							
69.0' - Fracture, 20 deg, smooth to rough, undulating							
NR							
70 -27.3							
71.5							



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 ORIENTATION : Vertical

WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
75 -32.3	R5-NQ 5 ft 70%	37	10	71.5-71.8' - Fracture zone, pieces to 1" x 3"		Limestone 67.75-69.8' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak (R2), 0-10% coverage of voids 1/16" or less except 10% coverage of 1/8" voids on surface and trace cavities to 5/16" at 68.1-68.4', no visible fossils, trace black organic staining No Recovery 69.8-71.5' Limestone 71.5-74.4' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak (R2), 0-10% coverage of voids 1/8", no visible fossils, no visible cavities except trace cavities up to 1 3/16" x 3/8" at 72.1-73.2', some infilled with similar material to surrounding rock except slightly darker color 74.4-75.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak (R1), 25-35% coverage of voids 3/8" or less, 10% coverage of 9/16" x 9/16" cavities, trace dark organic inclusions, moderate to highly fossiliferous with casts to 3/16" No Recovery 75.0-76.5' Limestone 76.5-77.4' - Same as 66.95-67.75' Silt (ML) 77.4-77.7' - moderate yellowish brown, (10YR 5/4), carbonate derived, overlying dark gray (N3) fat clay (CH) Limestone 77.7-79.2' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, medium strong (R3), 0-15% coverage of voids 1/8" or less, trace cavities up to 1 3/4" x 3/4" with dark yellowish orange (10YR 6/6), infill and increased % voids, trace fossil casts to 3/16" x 3/8" in size No Recovery 79.2-81.5' Limestone 81.5-82.9' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), except for bands 3/4"-1" (lighter colored) from 81.9-82.1' and 82.5-82.8', 40% coverage of voids <1/16" on surface, few elongate cavities <3/4" diameter	Driller's Remark: 71-72' and 74-74.5' void	
			10	72.0' - Bedding plane, <5 deg, smooth to rough, undulating, 1/4" open, missing faces				
			10	72.8-72.9' - Fracture zone, pieces to 1/2" diameter				
			3	73.15' - Bedding plane, horizontal, smooth, planar, tight				
			3	73.9' - Fracture, 15 deg, smooth, undulating, tight				
			NR	74.25' - Bedding plane, horizontal, smooth to rough, undulating, tight to 1/4" open				
			NR	74.4' - Bedding plane, rough, undulating, tight to 1/4" open			R5: 6 minutes	
			NR	74.6' - Bedding plane, horizontal, smooth to rough, undulating, tight to 1/4" open				
			10	74.7' - Fracture, vertical, smooth, undulating, tight				
			10	74.85' - Fracture, 60 deg, smooth, undulating, tight				
80 -37.3	R6-NQ 5 ft 54%	43	0	77.25-77.8' - Fracture zone, pieces to 2" diameter			R6: Run time not recorded	
			NR					
			2	81.5-81.6, 82.45-82.55, 82.8-82.95, 83.65-83.66' - Fracture zone, rough to smooth, undulating to stepped, fine to coarse size gravel 1-2" diameter, fragments up to 2" diameter			End of drilling for 5/19/07 Resume drilling 5/20/07 07:35 Water level is 6.0' below ground surface Driller's Remark: Soft at 82-82.5', 83-83.5', 84.5-85'	
			8	82.1, 83.15, 83.25, 83.45' - Bedding plane or mechanical break, 10 deg, smooth to rough, undulating to stepped, <1/2" open				
			1	82.6, 82.9' - Fractures (2), 70 deg, rough, stepped to undulating, double fracture				
85 -42.3	R7-NQ 5 ft 46%	10	NR				R7: 5 minutes	
			2	86.35' - Bedding plane or mechanical break, 10 deg, smooth to rough, undulating, tight to 3/4" open				
			0	86.5-86.6' - Fracture zone, with pieces to 2" diameter				
			1	88.6' - Mechanical break			SC-1 collected at 88.7-89.55'	
			6	89.4-89.65' - Fracture zone, 0-10 deg, smooth to rough, undulating, all bedding plane fractures, tight to 1/2"				
90 -47.3	R8-NQ 5 ft 80%	58	NR	90.25-90.5' - Fracture zone, with pieces to 2" diameter			R8: 4 minutes	
			NR					
91.5								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 6 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 ORIENTATION : Vertical
 WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
95 -52.3	R9-NQ 5 ft 88%	29	>10		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 1/16" or less on surface, few cavities, few black laminations No Recovery 83.8-86.5' Limestone 86.5-90.5' - moderate yellowish 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 rock, trace fossil casts to 1/4" diameter No Recovery 90.5-91.5' Limestone 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 92.2-93.8' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCl reaction, very weak (R1), 10-20% coverage of voids 1/2" or less, trace cavities up to 3/8" in diameter, moderately fossiliferous, trace black organic material at 93.6' up to 1/16" diameter 93.8-95.9' - 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 sized material (carbonaceous), clay seam at 95.2-95.4' (CL) yellowish gray (5Y 7/2) No Recovery 95.9-96.5' Limestone 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 or fossils No Recovery 97.0-101.5' Limestone 101.5-102.0' - very pale orange to grayish orange, (10YR 8/2, 10YR 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% No Recovery 102.0-106.5' Limestone 106.5-109.95' - Same as 101.5-102.0' except extremely weak (R0) from 107.2-109.3' No Recovery 109.95-111.5'	R9: 5 minutes Driller's Remark: Sampler clogged; shoe jammed closed with rock resulting in sample loss R10: 9 minutes R11: Run time not recorded R12: Run time not recorded	
100 -57.3	R10-NQ 5 ft 10%	0	>10		92.1-92.9' - Fracture zone 92.95, 93.0, 93.2' - Fractures (3), horizontal, rough, undulating 93.3-93.8' - Fracture zone, horizontal, rough, undulating, fractures along bedding plane 94.0' - Fracture, horizontal, smooth, undulating 94.1' - Fracture, horizontal, rough, undulating 94.5, 94.6' - Fractures (2), horizontal, smooth to rough, undulating 94.7, 94.9, 95.0' - Fractures (3), horizontal, smooth to rough, planar 95.1, 95.25, 95.3, 95.8' - Fractures (4), horizontal, smooth, planar to undulating 96.5-97.0' - Fracture zone, horizontal, dark stains on faces, pieces 3" x 2", many bedding plane fractures		
105 -62.3	R11-NQ 5 ft 10%	0	NR		101.6-101.8' - Fracture zone		
110 -67.3	R12-NQ 5 ft 69%	0	7		106.8' - Bedding plane, horizontal, smooth, planar, tight 106.9, 106.95, 107.0, 107.1, 107.2 107.5' - Bedding plane (6), horizontal, smooth, undulating to stepped 107.5-109.3' - Fracture zone, horizontal, smooth, undulating, bedding plane fractures, up to 1/8" open 109.3-109.65' - Fracture zone		
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 7 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 ORIENTATION : Vertical
 WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
115 -72.3	R13-NQ 5 ft 85%	0	>10	111.5-111.9' - Bedding plane, horizontal, smooth, planar, 1" bedding 111.9-112.4' - Fracture zone		Limestone 111.5-111.65' - Same as 101.5-102.0' 111.65-115.25' - yellowish gray, (5YR 7/2), fine grained, very weak (R1), trace voids up to 1/16", thinly bedded (1/8"-3/4"), extremely weak rock (R0) at 114.3-114.9' No Recovery 115.75-116.5'	R13: 5 minutes
116.5		>10	112.65-115.75' - Bedding plane, smooth, planar to undulating, 1/8" to 1/2" beds				
120 -77.3	R14-NQ 5 ft 72%	13	>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' - Bedding plane or mechanical break (12), 10 deg, rough, undulating 117.0-117.2' - Fracture zone			
121.5		1	>10	119.0-119.5' - Fracture zone			
125 -82.3	R15-NQ 5 ft 47%	12	4	119.8' - Fracture, 15 deg, smooth, undulating, tight		Limestone 119.1-120.1' - yellowish gray, (5Y 8/1), medium to coarse grained, strong HCl reaction, weak (R2), 15-25% coverage of voids to 3/16", fossil casts up to 1" x 3/8" over 60% of rock No Recovery 120.1-121.5' Limestone 121.5-123.25' - Same as 116.5-119.1' 123.25-123.85' - Same as 119.1-120.1' except 5-10% coverage of <3/8" fossil casts No Recovery 123.85-126.5'	R14: 3 minutes
126.5		10	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, 1/8"-1/4" open 122.9-123.25' - Fracture zone or bedding plane, 10 deg, smooth, undulating, 1/4" open, beds are 1/2" thick 123.35-123.6' - Fracture zone, fine to coarse pieces 123.75' - Fracture, 20 deg, rough, undulating				
130 -87.3	R16-NQ 5 ft 70%	8	6	126.6, 126.95, 127.1, 127.2, 127.35, 127.4, 127.6, 127.7, 127.8' - Fractures (9), horizontal, smooth to rough, undulating, along bedding, tightly healed to 1/8" open 127.85-127.95' - Fracture zone			
131.5		6	6	128.2, 128.4, 128.6, 128.75, 128.85, 129.0, 129.2, 129.45, 129.6, 129.75, 129.8' - Fractures (11), horizontal, rough, undulating, 1/8" - 1/4" open			
			7	128.4-129.25' - Same as 119.1-120.1'			R15: 4 minutes Driller's Remark: Last foot "feels like gravel"
			3				
			NR				R16: 3 minutes



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 ORIENTATION : Vertical
 WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
135 -92.3	R17-NQ 5 ft 17%	0	NR	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 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'	Driller's Remark: Brief loss of circulation R17: 5 minutes	
140 -97.3	R18-NQ 5 ft 67%	0	NR	>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" >10 137.7-138.95' - Fracture zone or bedding plane, 5 deg, rough, planar to undulating, open 1/8" or less 1 139.2, 139.45, 139.6' - Bedding plane or mechanical break (3), 10 deg, rough, planar, tight NR	Limestone 136.5-137.6' - Same as 116.5-119.1' 137.6-139.85' - very pale orange, (10YR 8/2), medium grained, strong HCl reaction, weak (R2), 5-15% coverage of voids to 1/8", trace fossil casts 3/8" x 3/16", no visible cavities, trace dark gray and light gray inclusions, dark laminations at 138.35-138.5', thin beds and laminates 1/4"-1/2" No Recovery 139.85-141.5'	R18: 5 minutes	
145 -102.3	R19-NQ 5 ft 78%	14	NR	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 >10 142.4, 143.2' - Fractures (2), <5-90 deg, smooth to rough, planar, bedding plane separation zone, beds are up to 1" thick >10 143.2-144.15' - Fracture zone, 0-90 deg, rough, undulating to stepped, open up to 1", angular fragments 1 144.15-144.7' - Fracture zone NR 145.43' - Mechanical break, 20 deg, tight	Limestone 141.5-143.2' - yellowish gray, (5YR 7/2), medium grained, strong HCl reaction, weak (R2), trace voids up to 1/16", no visible cavities, trace fossil casts 3/8" X 3/16", trace dark organic material 143.2-144.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), trace voids up to 1/16", 10-15% coverage of cavities up to 1 9/16" x 3/8" partially infilled with medium grain sized carbonate material, fossil molds, trace dark (organic) infill 144.2-145.3' - pale yellowish brown, (10YR 6/2), fine grained, weak (R2), 5-10% coverage of voids up to 3/16", 5-10% coverage of cavities up to 3/8" x 9/16", dark laminations at 145.1' 145.3-145.4' - yellowish brown, (10YR 6/2), mild HCl reaction, medium strong (R3), no visible fossils or cavities, dark red staining on fracture surfaces No Recovery 145.4-146.5'	R19: Run time not recorded	
150 -107.3	R20-NQ 5 ft 62%	30	NR	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 2 146.9-147.1' - Fracture zone 147.5-147.65' - Fracture zone 1 149.2-149.6' - Fracture, 70 deg, smooth to rough, undulating, tight 0 NR	Limestone 145.4-146.5' - yellowish brown, (10YR 6/2), mild HCl reaction, medium strong (R3), no visible fossils or cavities, dark red staining on fracture surfaces No Recovery 145.4-146.5'	R20: Run time not recorded	
151.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-11	SHEET 9 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 ORIENTATION : Vertical
 WATER LEVELS : 6.0 ft bgs on 5/20/07 START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					Limestone 146.5-147.9' - moderate yellowish brown to yellowish gray, (10YR 6/4 to 5Y 7/2), medium to coarse grained, strong HCl reaction, very weak (R1), trace voids to 1/16", no visible cavities or fossils 147.9-149.35' - dusky yellow, (5Y 6/4), fine to medium grained, moderate HCl reaction, medium strong (R3), trace coarse grain sized inclusions, trace voids up to 1/16", no visible cavities or fossils No Recovery 149.6-151.5 Bottom of Boring at 151.5 ft bgs on 5/20/2007	Drilling completed at 14:56 on 5/20/07	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
43.3	0.0	1.3	SS-1	0-2-2 (4)	Poorly Graded Sand With Organics (SP) 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 grained, 20% organics decreasing to <5% with depth, trace nonplastic fines, sand is silica		
	1.5						
5	5.0	1.5	SS-2	2-1-0 (1)	Poorly Graded Sand With Silt (SP-SM) 5.0-6.5' - dusky yellow, (5Y 6/4), wet, very loose, very fine to fine grained, trace roots, trace concretions to coarse sand-sized, 8% nonplastic fines, sand is silica		For SS-2 the last 6" SPT was weight of hammer
38.3	6.5						
10	10.0	0.8	SS-3	34-50/4 (84/10")	Silt (ML) 10.0-10.8' - yellowish gray, (5Y 7/2), moist to wet, hard, nonplastic, very rapid dilatancy, mild HCl reaction, trace to 10% very fine to fine sand-sized carbonate		
33.3	10.8						
15	15.0	0.8	SS-4	47-50/4 (97/10")	Silt (ML) 15.0-15.8' - yellowish gray, (5Y 7/2), moist to wet, hard, nonplastic, very rapid dilatancy, mild HCl reaction, carbonate, trace fine gravel-sized limestone fragments		
28.3	15.8						Driller's Remark: Harder at 18'
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-12	SHEET 2 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
 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 : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
23.3	20.0	1.2	SS-5	15-17-14 (31)	Silt With Sand (ML) 20.0-21.2' - dusky yellow, (5Y 6/4), moist to wet, dense, fine to coarse grained, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 5% fine gravel-sized, 20% fine to coarse sand, all carbonate		
	21.5						
25	25.0	0.7	SS-6	17-50/6 (67/12")	Silty Sand With Limestone Fragments (SM) 25.0-25.7' - dusky yellow, (5Y 6/4), moist to wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 25-30% nonplastic fines, 15% fine gravel-sized limestone, all carbonate		
18.3	26.0						
30	30.0	0.9	SS-7	26-15-8 (23)	Limestone Fragments 30.0-30.4' - dusky yellow, (5Y 6/4), mild HCl reaction, wafer shaped fragments to 1/2" thick		
13.3	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, 20-25% very fine to medium grained sand, all carbonate		
35	35.0	1.0	SS-8	6-10-19 (29)	Silty Sand With Limestone Fragments (SM) 35.0-36.0' - dusky yellow, (5Y 6/4), moist to wet, medium dense, fine to coarse grained, mild to moderate HCl reaction, 34% nonplastic fines, 15% fine-coarse gravel-sized limestone, all carbonate		
8.3	36.5						
40							Driller's Remark: Hit hard layer at 38'



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				50/3 (50/3")			
3.3	40.0	0.3	SS-9	50/3 (50/3")	Limestone Fragments 40.0-40.3' - light olive gray, (5Y 5/2), mild HCl reaction, fragments up to 1" in size		Driller's Remark: Run was hard until last few tenths
45 -1.7	45.0	1.5	SS-10	10-18-20 (38)	Silt (ML) 45.0-46.5' - moderate olive brown, (5Y 4/4), moist to wet, dense, fine to coarse grained, mild HCl reaction, 57% nonplastic fines, 15-20% fine gravel-sized limestone fragments, all carbonate		
	46.5						
50 -6.7	50.0	1.3	SS-11	24-37-48 (85)	Silty Sand With Limestone Fragments (SM) 50.0-51.3' - moderate olive brown, (5Y 4/4), moist to wet, dense, fine to coarse grained, mild HCl reaction, 25% nonplastic fines and 30-35% fine to coarse gravel-sized limestone fragments		
	51.5						
55 -11.7	55.0	0.8	SS-12	21-31-50/1 (81/7")	Silty Sand With Limestone Fragments (SM) 55.0-55.8' - moderate olive brown, (5Y 4/4), moist to wet, dense, fine to coarse grained, mild HCl reaction, 25% nonplastic fines and 30-35% fine to coarse gravel-sized limestone fragments		
	56.1						
	60.0	0.1	SS-13	50/1 (50/1")	Limestone Fragments 60.0-60.1' - moderate olive brown, (5Y 4/4), mild HCl reaction, one limestone fragment recovered		End soil sampling at 60.0'
	60.1						
60					Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-16.7	60.0	58	5	60.1-60.3' - Mechanical break, rough, undulating, multiple angles	Limestone 60.0-61.8' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, medium strong (R3), small voids 1/16"-1/8" over 40% of surface, trace organics, 5% voids to 3/8"	Begin rock coring at 60'	
	R1-NQ 5 ft 98%		5	60.4' - Fracture, 50 deg, rough, undulating, open, dark gray accretion over 30% of surface, <0.01' thick			
			>10	60.75' - Fracture, horizontal, rough, undulating, tight			
			1	61.15-61.3' - Fracture zone, rough, undulating, multiple angles			
			2	61.8' - Fracture, horizontal, rough, undulating, tight			
65	65.0	40	NR	62.3' - Bedding plane, horizontal, at interface with soft material	61.8-62.6' - pale yellowish brown, (10YR 6/2), mild HCl reaction, extremely weak to very weak (R0 to 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 63.25-64.5' - Same as 61.8-62.6' 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 5/9), <10% small (<1/16") voids on 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, (5Y 4/4), with compacted carbonate silts, trace fossils on surface, trace small voids to 1/16"	R1: 8 minutes	
-21.7	R2-NQ 5 ft 64%		0	62.4-62.6' - Fracture zone, soft material, multiple fragments			
			NR	63.3, 64.2, 64.4' - Bedding plane (3), horizontal, rough, undulating, tight			
			2	64.5' - Fracture, 20 deg, rough, undulating, open			
			3	68.2' - Bedding plane, <20 deg, pieces missing could be because soft material or dissolution, open <1/8"			
70	70.0	48	2	68.8' - Fracture, 75 deg, rough, undulating, open <1/8"	70.0-73.45' - light olive gray, yellowish brown and moderate olive 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 seen on surface	R2: 7 minutes	
-26.7	R3-NQ 5 ft 80%		>10	69.1' - Fracture, 40-50 deg, rough, undulating, open			
			2	69.7, 69.9' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8"			
			>10	70.7, 71.85, 72.5 and 73.45' - Bedding plane (4), <5 deg, rough, undulating, open <1/8"			
			NR	70.85, 71.1' - Bedding plane (2), <5 deg, rough, undulating, tight			
75	75.0	22	>10	71.15-71.45' - Fracture zone	73.45-74.0' - yellowish brown, (10YR 5/4), moderate HCl 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'	R3: 8 minutes	
-31.7	R4-NQ 5 ft 42%		1	71.95' - Bedding plane, <5 deg, rough, undulating, open 1/2"			
			NR	73.8-74.0' - Fracture zone			
80	80.0			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		Driller's Remark: No resistance felt-very soft at 77.0-77.5' and 78.0-78.2' Assume core loss from 77.1' onward	
						R4: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-12	SHEET 5 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 ORIENTATION : Vertical

WATER LEVELS : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
-36.7	R5-NQ 5 ft 72%	23	1	80.1' - Fracture zone, rough	Limestone 75.0-77.1' - Same as 70.0-73.45' except color grades from pale olive (10Y 6/2) to light olive grey (5Y 5/2) at 75.2', moderate yellowish brown (10YR 5/4) mottling, moderate HCl reaction, very weak, weak to medium strong (R2 to R3) at 75.6-77.1', tightly compacted silts, <10% small voids to 1/16", no fossils seen on surface No Recovery 77.1-80.0' Silt (ML) 80.0-80.2' - moderate yellowish brown, (10YR 5/4), medium plasticity, 3/4" limestone fragments Limestone 80.2-83.6' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, weak to medium strong (R2 to R3), small (1/16") voids 15-20% of surface, larger cavities/fossil molds up to 3/4", fine grained interval from 81.3-82.5' No Recovery 83.6-85.0' Limestone 85.0-86.0' - moderate yellowish brown, (10YR 5/4), medium grained, 30-40% voids up to 1/8" in size, trace fossil molds/cavities up to 3/8", trace fossil casts up to 5/16" 86.0-88.1' - Same as 85.0-86.0' except fine grained, weak (R2), 10-20% inclusions of dark orange material up to 3/8" from 87.2-87.4' No Recovery 88.1-90.0' Limestone 90.0-92.2' - Same as 85.0-86.0' 92.2-94.0' - grayish orange, (10YR 7/4), fine grained, weak (R2), voids (up to 1/16") 0-5% from 92.2-93.2', trace fossils casts/cavities up to 3/8"x1-3/16" at 92.8' and at 93.2-93.7', very weak rock (R1) at 93.0-93.2' No Recovery 94.0-95.0' Limestone 95.0-96.3' - very pale orange, (10YR 8/2), very fine to fine grained, weak (R2), <5% voids up to 1/16" in size, dark laminae over 50% of surface at 95.5-95.7' 96.3-97.4' - Same as 95.0-96.3' except very weak (R1), voids (1/16"-1/8") up to 15%, fossil molds/cavities up to 3/8"x3/16" over 5-10% of rock, poorly to moderately fossiliferous with depth No Recovery 97.4-100.0'	End drilling for the day, 80.0' at 1800 hrs on 5/9/07 P. De Sa'Rego begins logging borehole SC-1 collected at 80.2-81.1'	
			6	81.2, 81.3' - Fracture (2), 7 deg, rough, undulating			
			3	81.4-81.6' - Fracture zone 81.8' - Mechanical break, 60 deg, rough, undulating, tight			
			2	82.1' - Fracture, horizontal, rough, planar, open <1/8" 82.3' - Bedding plane, horizontal, smooth, planar			
			NR	82.4, 82.75, 83.1, 83.4' - Fractures, <10 deg, smooth to rough, undulating			
85 -41.7	R6-NQ 5 ft 62%	20	4	85.2-85.25' - Fractures (2), 20-30 deg, smooth to rough, planar			
			4	85.35, 85.55' - Fractures (2), horizontal, rough, planar			
			>10	86.2' - Fracture, horizontal, rough, undulating, tight 86.3' - Mechanical break, 45 deg 86.9' - Fracture, horizontal, rough to smooth, undulating, tight		Driller's Remark: "soft" zones 87.5-88.0', 89.5-90.0'	
			NR	87.2-87.3' - Fracture zone 87.6-87.8' - Fracture zone, 30 deg, rough, stepped to undulating, possible mechanical break		R6: 5 minutes	
90 -46.7	R7-NQ 5 ft 80%	37	>10	90.0-90.6' - Fracture zone			
			4	91.1' - Mechanical break, <5 deg, rough, undulating, tight, possibility due to large cavity			
			4	91.65-92.2' - Fracture zone, 0-30 deg, rough, planar to undulating		SC-2 collected at 92.6-93.45'	
			2	93.0' - Fracture, horizontal, rough, undulating, 1/8" relief 93.2' - Fracture, horizontal, smooth, planar		R7: 8 minutes	
			NR	93.6' - Fracture, horizontal, smooth, planar, 1/4" relief			
95 -51.7	R8-NQ 5 ft 48%	28	>10	95.05' - Fracture, horizontal, smooth, undulating, 3/16" relief			
			5	95.32-95.56' - Clay seam, horizontal, smooth, planar, contact on both sides, tight, some black staining on lower surface			
			1	95.8-96.0' - Fracture zone 96.2-96.3' - Fracture zone 96.65-96.95' - Mechanical break		R8: 8 minutes	
100	100.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-56.7	R9-NQ 5 ft 68%	26	3	100.2' - Fractures (3), 40 deg, planar, small fragments	|	Limestone 100.0-103.4' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak (R0), exhibits 8-15% fossil cast related open space, and there are sporadic small <1/4" shells, blebs of carbon are visible at 1% or less No Recovery 103.4-105.0'	M. Faurote begins logging borehole	
5			100.4' - Mechanical break, 2-5 deg, smooth, planar					
>10			101.2, 101.6' - Mechanical break, 0-2 deg, smooth, planar					
>10			101.8' - Fracture, 60 deg, rough, undulating, open, the fracture is sub parallel to another fracture that is not separated					
NR			101.9, 101.95' - Fractures (2), fragments are 1" in diameter 102.5, 102.65, 102.7' - Bedding plane (3), smooth, undulating					
105	R10-NQ 5 ft 69%	28	>10	105.2-106.05' - Fracture zone, 0-3 deg, smooth, undulating, bedding plane separations, primarily depositional, 1/2" spacing	|	Limestone 105.0-108.45' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak (R0), thin bedding, the organic content remains the same, but exhibits planar surface coating at 105.1', numerous 1/2" beds with distinctive partings in two zones. The thin bedded materials show 10-15% open space from fossil casts and molds. The more persistent, larger beds exhibit larger shell openings and small dissolution cavities up to 3/8"	R9: 4 minutes	
2			106.7' - Mechanical break					
>10			107.1' - Mechanical break					
0			107.2-107.7' - Fracture zone, 0-3 deg, smooth, undulating, bedding plane separations, primarily depositional, 1/2" spacing					
NR			108.0' - Mechanical break, horizontal					
110	R11-NQ 5 ft 69%	22	3	110.7-112.0' - Bedding plane, multiple partings with beds from 1/8" or less to 8" or more	|	No Recovery 108.45-110.0' Limestone 110.0-113.45' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak (R0), exhibits 8-15% fossil cast related open space, and there are sporadic small <1/4" shells, blebs of carbon are visible at 1% or less No Recovery 113.45-115.0'	There is a carbonate sand associated with some of the lost recovery zones. This limestone continues to at least 115.0'	
2								
>10								
>10								
NR								
115	R12-NQ 5 ft 0%	0	NR		|	No Recovery 115.0-120.0'	R11: 6 minutes End drilling for the day at 17:51 on 5/10/07 D. Whitaker begins logging borehole Core barrel slid back to bottom of hole Medium dark sand grains on outside of barrel may/may not not be carbonate R12: 5 minutes	
120								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-12	SHEET 7 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 ORIENTATION : Vertical
 WATER LEVELS : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-76.7	R13-NQ 5 ft 0%	0	NR			No Recovery 120.0-125.0'	Water level 4.3' below ground at 08:00, 05/17/08 Interval may be sand, not rock R13: 4 minutes	
125 -81.7	R14-NQ 5 ft 0%	0	NR			No Recovery 125.0-130.0'	R14: 3 minutes	
130 -86.7	R15-NQ 5 ft 46%	0	NR	>10 >10 >10	130.0-130.4' - Fracture zone, rough, undulating, gravel size fragments <2" diameter 130.5-132.25' - Bedding plane (14), <10 deg, smooth to rough, undulating, tight to open 1/2"	Limestone 130.0-132.3' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace voids, no cavities, no fossil molds No Recovery 132.3-135.0'	R15: 4 minutes	
135 -91.7	R16-NQ 5 ft 70%	20	1	>10 >10 1 >10 NR	135.0-135.1, 135.5-135.6, 135.8-135.9, 136.05-136.2, 138.1-138.2, 138.3-138.4' - Fracture zone (6), rough, undulating, gravel size fragments <1" diameter 135.2-135.45, 135.6, 135.85-135.95, 136.35-138.05' - Bedding plane or mechanical break (18), <10 deg, smooth to rough, undulating, open <3/4"	Limestone 135.0-135.7' - yellowish gray, (5Y 8/1), very fine to medium grained, extremely weak to very weak (R0 to R1), trace coarse grains 135.7-136.2' - Same as 135.0-135.7' except very fine to fine grained, medium strong (R3), no voids 136.2-138.5' - Same as 135.0-135.7' except fine to coarse grained, strong HCl reaction, voids 1/4" or less over 10% of surface, trace fossils and fossil molds, no cavities No Recovery 138.5-140.0'	R16: 5 minutes	
140								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-12	SHEET 8 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 ORIENTATION : Vertical
 WATER LEVELS : 4.3 ft bgs on 5/17/07 START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-96.7	R17-NQ 5 ft 48%	10	9	140.1-140.9' - Bedding plane (8), <10 deg, slickensided to rough, undulating, open 1/2" or less		Limestone 140.0-141.0' - yellowish gray, (5Y 8/1), very fine to medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace small (1/16" or less) voids, few fossils, trace recrystallization, trace coarse grained 141.0-142.4' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl reaction, medium strong (R3), <5% coverage of small (1/16") voids, 10% cavities and fossil molds, trace fossils No Recovery 142.4-145.0'	R17: 9 minutes	
>10			140.95-141.4, 142.0-142.4' - Fracture zone (2), rough, stepped to undulating, fine to coarse gravel sized fragments <2" diameter					
>10								
145	R18-NQ 5 ft 90%	72	2	145.6' - Fractures (2), 60 deg, smooth and undulating, rough and stepped, perpendicular fractures, open <1/8"		Limestone 145.0-146.05' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl reaction, weak (R2), 5% voids 1/16" over 50% of interval, no cavities or fossils 146.05-149.5' - yellowish gray, (5Y 8/1), very fine to medium grained, strong HCl reaction, very weak (R1), 20% coverage of voids 1/16", trace fossils and fossil molds No Recovery 149.5-150.0'	SC-3 collected at 147.0-148.0' R18: 8 minutes	
-101.7			3	146.0' - Mechanical break				
			0	146.3-146.9' - Bedding plane (5), <10 deg, slickensided to rough, undulating, open <1/2"				
			1	148.0' - Mechanical break				
			3	148.85-149.45' - Bedding plane (4), <10 deg, slickensided to rough, undulating, open <1/2"				
			NR					
150						Bottom of Boring at 150.0 ft bgs on 5/17/2007	Total depth is 150.0'	
-106.7								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-13	SHEET 1 OF 8
SOIL BORING 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
 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 bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.2	0.0	0.9	SS-1	2-2-2 (4)		
	1.5					
5 37.2	5.0	0.6	SS-2	1-1-0 (1)		
	6.5					
10 32.2	10.0	1.1	SS-3	29-30-34 (64)		
	11.5					
15 27.2	15.9	0.1	SS-4	50/1 (50/1")		
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-13	SHEET 2 OF 8
SOIL BORING 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
 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 bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.2	20.0	1.2	SS-5	29-36-26 (62)		Some rig chatter from 20-25'
	21.5					
25	25.0	0.6	SS-6	5-11-14 (25)		
17.2	26.5					
30	30.0	0.0	SS-7	50/2 (50/2")		
12.2	30.2					
35	35.0	1.3	SS-8	32-43-50/5 (93/11")		Hard drilling at 38'
7.2	36.4					
40	40.0	0.1	SS-9	50/2.5 (50/2.5")		
	40.2					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 2.0 ft bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
2.2	40.0		10	40.0-40.35' - Fracture zone, limestone fragments, various orientations	Limestone 40.0-41.7' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak (R2), fossiliferous (casts/molds) with some cavities generally 3/8"x3/16", voids up to 1/16" over 25%-30% of rock surface, light olive gray intraclasts, suspended in fine grained matrix (intraclasts typically 3/8"x3/16" or less). No Recovery 41.7-45.0'	At 40.0' switched over to NQ rock coring R1: 3 minutes	
	R1-NQ 5 ft 34%	20	1	40.35' - Bedding plane or mechanical break, horizontal, rough, planar, loose			
			NR	41.35' - Fracture, horizontal to 40 deg, rough, stepped, loose			
45 -2.8	45.0		4	45.1' - Fracture, 70 deg, rough, planar, tight	Limestone 45.0-49.4' - Same as 40.0-41.7' except very weak (R1) No Recovery 49.4-50.0'	Driller's Remark: 46.0-48.0' very soft R2: 3 minutes	
	R2-NQ 5 ft 88%	69	0	45.5' - Bedding plane, horizontal, undulating, loose			
			2	45.65' - Fracture, 60 deg, rough, stepped, loose			
			1	45.9' - Fracture, 50 deg, rough, undulating, loose			
			0	47.2' - Bedding plane, horizontal to <5 deg, rough, stepped, loose			
			NR	47.5, 47.8' - Fractures (2), horizontal to >80 deg, rough, undulating, extending into incipient fracture trace that dies out			
50 -7.8	50.0		2	48.75' - Bedding plane, <5 deg, rough, undulating, loose, intersected by incipient fracture that is nearly vertical and dies out at end of R2	Limestone 50.0-53.5' - Same as 40.0-41.7' except cavities more common up to 3-5%, fossiliferous cast/molds becoming more fossiliferous with depth, extremely weak zone (R0) from 52.65 to 56.85', incipient fracture from 50.9-51.2', inclined 70 degrees. 53.5-54.1' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids covering 10%-15%, cavities rare (<3/16"x3/16"). No Recovery 54.1-55.0'	Driller's Remark: 52.5-53.0' soft Driller's Remark: 53.5-54.5' soft R3: 5 minutes	
	R3-NQ 5 ft 82%	72	1	50.35' - Fracture, 20 deg, rough, undulating, tight			
			3	50.7' - Fracture, 70 deg, rough, stepped/undulating, tight, black organic staining on 1-3% surface			
			NR	51.8' - Fracture or mechanical break, <5 deg, rough, stepped, loose			
			NR	52.65' - Fracture or mechanical break, <5 deg, rough, stepped, tight			
55 -12.8	55.0		1	53.01' - Fracture, 40 deg, rough, undulating, tight	Limestone 55.0-59.5' - Same as 53.5-54.1' 55.9-58.5' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 5/6), mild HCl reaction, weak (R2), with thin wispy laminae of black organic (N1) material, fossiliferous (casts and molds), voids covering 35-40% of surface and cavities generally less than 3/16"x3/16". No Recovery 58.5-60.0'	SC-1 collected at 55.0-55.95' R4: 5 minutes	
	R4-NQ 5 ft 70%	18	>10	53.3-53.45' - Fracture zone, rough, stepped to undulating, 60-70 deg to horizontal, tight to loose			
			10	55.95' - Bedding plane or mechanical break, horizontal to <5 deg, rough, stepped, loose			
			2	56.38-56.7' - Fracture zone, gravel-sized limestone rock fragments, various orientations			
			NR	56.9-57.05' - Fracture zone, various orientations			
60	60.0			57.4-57.6' - Fracture zone, same as 56.38-56.7'			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-17.8	R5-NQ 5 ft 69%	55	3	57.9-58.25' - Fracture zone, horizontal to 60 deg, rough, with bedding plane fractures at 58.15' and 58.25', inclined fracture from 57.9-58.15', rough, undulating to stepped, loose.		Limestone 60.0-63.45' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), fine to very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts/molds), voids up to 1/16" covering up to 50-60% surface, extremely weak rock (R0) from 60.1' to 62.5' with some silt and sand-sized limestone rock fragments, some voids up to 3/8-3/4" x 3/8-3/4".	Driller's Remark: 62.0-64.0' very soft Driller's Remark: All fairly soft to 64.0' R5: 4 minutes	
0			60.5, 60.6, 60.7' - Bedding plane (3), horizontal to <5 deg, rough, stepped, loose					
10			62.15-62.55' - Fracture zone, rough, extremely soft rock, some bedding plane fractures horizontal to vertical, undulating/stepped, tight to loose					
0								
NR								
65 -22.8	R6-NQ 5 ft 88%	26	4	65.1, 65.2' - Bedding plane (2), horizontal to <5 deg, rough, stepped, loose		Limestone 65.0-69.4' - Same as 60.0-63.45' except extremely weak rock (R0) (similar to 62.1-62.5') from 66.0-66.7' and 69.0-69.4'.	R6: 4 minutes Driller's Remark: 69.5-70.0' very soft	
2			65.5' - Bedding plane, <5 deg, rough, loose					
>10			65.8, 66.35' - Bedding plane (2), <5 deg, rough, loose					
0			66.7- 67.7' - Fracture zone, >80 deg to vertical, series of several fractures, rough, undulating to stepped, loose					
1			69.0-69.1' - Fracture zone, horizontal to 60 deg, rough, undulating, tight					
70 -27.8	R7-NQ 5 ft 62%	16	1	70.1-70.15' - Fracture zone, horizontal to 60 deg, rough, stepped, loose		Limestone 70.0-73.1' - light olive gray, (5Y 5/2), 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'	SC-2 collected at 70.15-71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes	
3			71.15' - Fracture, horizontal to 40 deg, rough, stepped, loose					
10			71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight					
NR			71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side					
NR			72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose					
75 -32.8	R8-NQ 5 ft 64%	30	2	72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose		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' No Recovery 78.2-80.0'	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' R8: 8 minutes	
>10			72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates 1/2 diameter of core					
3			75.7' - Fracture, 70 deg, rough, undulating/stepped, tight					
1			75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose					
NR			76.3' - Bedding plane, horizontal, rough, planar					
80	80.0			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 stepped, tight				



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-37.8	R9-NQ 5 ft 96%	82	0	77.78' - Bedding plane, <5 deg, rough to smooth, loose		Limestone 80.0-81.2' - fine grained, moderate to strong HCl reaction, medium strong (R3), trace fossils becoming more common with depth (molds/casts), voids grading from 10% to 20% with depth, cavities becoming more common with depth up to 3/8"x3/8". Clay (CL) 81.2-81.3' - black, wet, soft, rapid dilatancy, (carbonaceous, organic layer) Limestone 81.3-81.9' - pale yellowish brown, (10YR 6/7), fine grained, mild HCl reaction, becoming thinly laminated with depth and variegated (mottled), voids (15-20%) decreasing with depth. 81.9-84.8' - Same as 80.0-81.2' except cavities up to 1" in diameter. No Recovery 84.8-85.0' Limestone 85.0-87.55' - Same as 81.9-84.8' 87.55-89.0' - yellowish gray, (5Y 7/2), mild HCl reaction, medium strong (R3), fine grained with some medium to coarse grained interclasts, fossiliferous, (casts/molds) very common, cavities up to 1" in diameter, some cavities filled with black organic material, voids and cavities over 40-50% of surface. No Recovery 89.0-90.0' Limestone 90.0-91.4' - Same as 87.55-89.0' 91.4-91.7' - white to very light gray, (N9 to N8), very fine grained, strong HCl reaction, extremely weak (R0), voids over 3%-5%, clayey. Silty Clay (CL-ML) 91.7-91.85' - white, (N9), moist, soft, no to slow dilatancy, cohesive. Limestone 91.85-92.3' - Same as 91.4-91.7' except gradational with unit below. 92.3-93.8' - white to very light gray, (N9 to N8), very fine grained, strong HCl reaction, medium strong (R3), fossils rare to absent, voids <1/16" over 1%-3%, rare cavities (3/8" x 3/8") with dark stain. Clay (CL) 93.8-93.85' - dark brown, dry, no dilatancy, strong HCl reaction, friable. No Recovery 93.85-95.0'	Driller's Remark: 81.5-82.5' soft SC-3 collected at 83.35-84.40' R9: 6 minutes	
85		0	77.9' - Bedding plane, <5 deg, rough, loose					
-42.8		85.0	NR	3	78.05' - Fracture, 60 deg, rough, planar			
				0	81.2-81.3' - Fracture zone, <5 deg, rough, undulating, tight with 0.05' black carbonaceous (organic) clay lining, soft, wet			
				0	81.6' - Bedding plane, horizontal to <5 deg, smooth, stepped to planar, loose			
	R10-5 ft 80%	71	0	81.9' - Bedding plane, <5 deg, rough, undulating, loose		Driller's Remark: 100% loss of water Driller's Remark: 88.5-89.5' soft R10: 7 minutes		
			0	88.0' - Bedding plane or mechanical break, horizontal, rough, undulating, loose				
			NR	10	88.55-88.75' - Fracture zone, horizontal, rough, undulating, gravel sized fragments, loose			
				NR	90.0-90.35' - Fracture zone, limestone rock fragments, various orientations			
90	R11-NQ 5 ft 77%	53	>10	90.35' - Fracture, horizontal, smooth, planar to undulating, loose		Driller's Remark: 5% water returns SC-4 collected at 92.0-92.87' R11: 9 minutes		
-47.8			1	90.5' - Bedding plane or mechanical break, horizontal, rough, undulating/stepped, loose				
				1	91.4' - Bedding plane, horizontal to 50 deg, rough, undulating, loose			
				0	92.07' - Bedding plane or mechanical break, 10 deg, smooth, planar, tight			
				NR				
95	R12-NQ 5 ft 95%	26	5	95.17' - Fracture, >80 deg, rough, stepped, loose		Driller's Remark: Medium hard run R12: 7 minutes		
-52.8			10	95.4, 95.6, 95.72, 95.9' - Fractures (4), horizontal to 30 deg, rough, planar to undulating, loose to tight				
				10	96.0' - Fracture, horizontal to <10 deg, rough, planar, loose			
				3	96.2-96.75' - Fracture zone, 70 to 80 deg, rough, undulating, loose			
				1	97.0' - Fracture, horizontal, smooth, undulating, loose			
				1	97.05-97.5' - Fracture zone, vertical to 0 deg, rough, loose			
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

WATER LEVELS : 2.0 ft bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-57.8	R13-NQ 5 ft 100%	NR	4	97.6, 97.9' - Fractures (2), horizontal, rough, planar, 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 reaction, weak (R2), fossiliferous (casts/molds) common, possible intraclasts, gastropod casts and molds common, voids and cavities over 40%-50% of rock surface. No Recovery 99.75-100.0' Limestone 100.0-105.0' - Same as 96.0-99.75' except fossils become less common along with voids and cavities; cavities 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'	R13: 7 minutes	
		10	98.0' - Fracture, 40 to 50 deg, rough, planar, loose				
		1	98.2, 98.4' - Fractures (2), horizontal, rough, undulating to stepped, loose				
		>10	99.05' - Fracture, <10 deg, rough, stepped, loose				
		10	100.25, 100.35, 100.6' - Bedding plane or mechanical break (3), <5 deg, rough to smooth, undulating				
105	R14-NQ 5 ft 50%	NR	NR	100.6-100.95' - Fracture, 70 to 80 deg, smooth, undulating, tight	Poorly Graded Sand (SP) 107.5-108.35' - moderate yellowish brown, (10YR 5/4), wet, loose, fine grained, moderately cohesive, moderate to well sorted, subangular to subrounded, trace to 5% heavy dark minerals, sharp contact with underlying limestone, sand is siliceous Limestone 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 weak (R0) zone from 109.5'-109.6' containing some clay, fossiliferous (very small echinoids) and other fossils, voids and cavities over 5%-10% with percentage increasing with depth. 110.0-113.7' - yellowish gray, (5Y 7/2), very fine grained, very strong 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 x 3/8", matrix very "chalk-like". No Recovery 113.7-115.0' Limestone 115.0-116.5' - Same as 110.0-113.7' No Recovery 116.5-118.5'	Suspect siliceous unconsolidated sand 105 - 107.5'	
-62.8		0	102.35' - Fracture or mechanical break, horizontal, rough, stepped, tight				
		>10	103.2-103.6' - Fracture zone, vertical to <5 deg, rough, undulating to stepped, loose to tight				
	16	10	108.35-109.0' - Fracture zone, vertical and horizontal planes, tight				
	0	10	109.5-109.6' - Fracture zone, horizontal to >80 deg				
110	R15-NQ 5 ft 74%	5	110.1, 110.38, 110.58, 110.63, 110.78, 111.02, 111.05, 111.2, 111.35, 111.4, 111.5, 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 fractures between horizontal discontinuities at 111.35-111.5' and 112.9-113.25'	R14: 8 minutes			
-67.8		9					
		10					
		10					
		NR					
115	R16-NQ 5 ft 57%	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 undulating, tight	R15: 4 minutes			
-72.8		10					
		NR	118.5' - Bedding plane, <5 deg, rough, undulating, loose				
		10					
120		4	119.17, 119.32, 119.6, 119.8' - Bedding plane (4), smooth to rough, planar to slightly undulating, loose	Driller's Remark: 117.5-118.5' Suspect sand bed, barrel plugged up, no circulation, tried to stop pump, barrel stalled, also evidenced by decreasing core diameter suggesting abrasion by sand			
					R16: 6 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 2.0 ft bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-77.8	R17-NQ 5 ft 78%	32	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 mechanical break (15), horizontal to <5 deg, rough, planar to undulating, loose		[Symbolic Log]	Limestone 118.5-120.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, weak (R2), fossiliferous with numerous casts/molds (gastropods, pelecypods, echinoids); cavities and voids over 20%-30% of surface. 120.0-120.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, weak (R2), fossiliferous (casts/molds) unfilled burrowed cavities/voids over 70%-80%, cavities up to 3/8" x 3/8". 120.6-123.2' - yellowish gray, (5Y 7/2), fine to very fine grained, strong 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'. 123.2-123.9' - Same as 120.0-120.6' No Recovery 123.9-125.0' Limestone 125.0-129.05' - Same as 120.6-123.2' except laminations absent. No Recovery 129.05-130.0'	R17: 7 minutes
			3					
			4	122.44' - Bedding plane, horizontal, smooth, within thin laminae, loose				
			5					
			NR					
125 -82.8	R18-NQ 5 ft 81%	0	7	125.05, 125.1, 125.22, 125.27, 125.55, 125.7, 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, 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), 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'		[Symbolic Log]		R18: 5 minutes
			7					
			10					
			>10					
			10 NR	128.97, 128.99' - Bedding plane or mechanical break (2), horizontal, rough to smooth, planar to undulating, generally loose				
130 -87.8	R19-NQ 5 ft 84%	24	4	130.35, 130.54, 130.75, 130.85, 131.05, 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), horizontal to <5 deg, smooth to rough, planar to undulating, loose		[Symbolic Log]		R19: 4 minutes
			9					
			2					
			3	133.0-133.3' - Fracture, 80 deg, rough, undulating, loose 133.5' - Fracture, horizontal to 80 deg, rough, stepped, loose				
			0 NR					
135 -92.8	R20-NQ 5 ft 44%	7	>10	135.2-135.9' - Fracture zone, horizontal to 90 deg, smooth to rough, undulating to planar, loose		[Symbolic Log]		R20: 4 minutes
			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 smooth, undulating to planar, loose				
			1					
			NR					
140	140.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 6/05/07 START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-97.8	R21-NQ 5 ft 89%	31	4	140.4, 140.45, 140.62, 140.76, 141.02, 141.1' - Bedding plane or mechanical break (6), horizontal, smooth, planar, loose		137.03-137.2' - medium gray, (N5), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), few voids. No Recovery 137.2-140.0' Limestone 140.0-141.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), fossils rare to absent; "chalk-like" texture, cavity infilling or supported by interclasts in fine grained matrix, grains up to 3/16" in diameter and dark gray and white (N9) in color, voids <1%.	R21: 6 minutes
10			141.25-141.6' - Fracture zone, various orientations, limestone gravel				
2			141.7, 141.85, 142.0, 142.25, 143.0, 143.15, 143.2, 143.28' - Mechanical break or fractures (8), horizontal to 60 deg, rough, stepped, tight				
5							
>10			144.0-144.45' - Fracture zone, limestone gravels, orientations unknown				
145	R22-NQ 5 ft 58%	0	NR			141.3-144.5' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), bioturbated with some cavities >1" long and >1" deep, some cavities infilled, some cavities lined with dark gray (N3) coatings, mottled texture with area of void-free limestone and zones of limestone with up to 60%-70% voids, fossiliferous in casts/molds of pelecypods and gastropods. No Recovery 144.5-145.0' Limestone 145.0-146.15' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), thinly laminated, fossils rare to absent, some voids up to 1/16" or less over 1%-3% of rock, cavities rare (3/8"x3/8"), sharp contact with underlying limestone. 146.15-147.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, weak (R2), very friable and loose (especially at 146.4' to 146.7'), with extremely weak (R0) rock at 146.4'-146.7', trace fossils, voids generally less than 1/16" over 60%-70% producing a grainy texture. No Recovery 147.9-150.0' Bottom of Boring at 150.0 ft bgs on 6/6/2007	R22: 7 minutes
-102.8			10	145.1' - Fracture, horizontal, smooth, undulating, loose			
			>10	145.2' - Fracture, 60 deg, smooth, stepped, tight			
			1	145.6-145.88' - Fracture zone, 85-90 deg along outside 1/5th of core, truncated at 145.88', split at 157.7' by <5 deg fracture			
150	R21-NQ 5 ft 58%	0	NR	145.93' - Fracture, horizontal, smooth, undulating, loose			
-107.8							
				146.45-146.7' - Fracture zone			
				146.7' - Fracture, <5 deg, rough, undulating, loose			
				146.85, 146.95, 147.05' - Bedding plane or mechanical break (3), horizontal to <5 deg, rough, undulating to stepped, loose			



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
 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 : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
41.7	0.0	0.8	SS-1	1-1-4 (5)	Topsoil 0.0-0.3' - grayish black to black, (N2 to N1), moist, organic fines and roots, wood chips Poorly Graded Sand With Silt (SP-SM) 0.3-0.75' - yellowish gray, (5Y 7/2), moist, loose, very fine to fine grained, trace organics decreasing with depth, 5% nonplastic fines, sand is silica		Start SPT at 08:15, 6/5/07
	1.5						
5	5.0						
36.7		1.1	SS-2	3-4-6 (10)	Sandy Fat Clay (CH) 5.0-5.4' - greenish gray, (5GY 6/1), moist, medium stiff, medium to high plasticity, slow dilatancy, 25-30% very fine to fine grained silica sand Silt (ML) 5.4-6.1' - dark yellowish orange, (10YR 6/6), wet, stiff, nonplastic, very rapid dilatancy, moderate HCl reaction, trace very fine grained sand, all carbonate material		Possible water table encountered at 7'
	6.5						
10	10.0						
31.7		1.3	SS-3	5-5-2 (7)	Sandy Silt (ML) 10.0-11.3' - dark yellowish orange, (10YR 6/6), wet, nonplastic, very rapid dilatancy, moderate HCl reaction, 25-30% fine to medium grained sand, all carbonate material		Driller's Remark: Lost circulation at 12' Driller's Remark: Hard formation Driller's Remark: Chatter throughout run from 10-15' Driller's Remark: Soft drilling at 12.5' Driller's Remark: Circulation loss at 13', hard drilling
	11.5						
15	15.0						
26.7		1.5	SS-4	16-3-19 (22)	Sandy Silt (ML) 15.0-15.5' - Same as 10.0-11.3' Limestone Fragments 15.5-16.5' - grayish orange, (10YR 7/4), mild to moderate HCl reaction, coarse sand-size to coarse gravel-size limestone fragments, fossiliferous		4-inch casing set at 15'
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-14	SHEET 2 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
 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 : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.7	20.0	1.4	SS-5	Limestone Fragments 20.0-21.4' - Same as 15.5-16.5'		Advanced 4-inch (HW) casing to 20', decision made to begin rock coring
	21.5			Begin Rock Coring at 21.0 ft bgs See the next sheet for the rock core log		
25						
16.7						
30						
11.7						
35						
6.7						
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
 WATER LEVELS : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
21.0	R1-HQ 5 ft 48%	35	4	21.0-21.3' - Fracture zone, fine to coarse grained subangular gravel 21.3' - Fracture, 10 deg, rough, planar	[Symbolic Log]	Limestone 21.0-21.3' - grayish orange, (10YR 7/4), mild to moderate HCl reaction 21.3-23.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 25% of rock surface, numerous elongate to platy cavities/molds from 1/4" up to 3/4" long, trace inorganic inclusions 23.0-23.4' - grayish orange, (10YR 7/4), strong HCl reaction, very weak (R1), voids (1/16") over 20% of rock surface, numerous fossil cavities/molds 1" in diameter or larger No Recovery 23.4-26.0' Limestone 26.0-26.7' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, very weak (R1) 26.7-29.2' - dusky yellow to medium yellowish brown, (5Y 6/4 to 10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 5-25% of rock surface, some 1/4" round cavities No Recovery 29.2-31.0'	Cavities at 21.6', 21.9', 22.6' R1: Run time not reported Cavity at 28.65'
25 16.7			1				
26.0			3	23.0' - Fracture, 10 deg, rough, stepped, loose 23.0-23.1' - Fracture zone			
			NR				
30 11.7	R2-HQ 5 ft 64%	40	1	26.7' - Fracture or mechanical break, horizontal, smooth, planar	[Symbolic Log]	Limestone 31.0-33.1' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to strong (R2 to R4), voids (1/16") over 10% of rock surface, few elongate cavities up to 1/4", transitions from strong to weak rock with depth, accompanied by increase to voids over 20% of rock surface 33.1-33.6' - Same as 31.0-33.1' lower portion except weak (R2) 33.6-35.2' - Same as 31.0-33.1' upper portion except strong (R4), 10% voids No Recovery 35.2-36.0' Limestone 36.0-36.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids (1/16") over 10-20% of rock surface, few elongate cavities up to 1/4" 36.8-37.4' - Same as 36.0-36.8' except extremely weak to weak (R0 to R2) 37.4-38.8' - Same as 36.0-36.8' except medium strong (R3) 38.8-39.3' - Same as 36.8-37.4'	R2: 3 minutes R3: 3 minutes Cavities at 37.2', 38.0'
31.0			1	27.7' - Fracture, 35 deg, rough, undulating, (almost smooth)			
35 6.7			2	28.0' - Fracture, horizontal, rough, undulating 28.6' - Fracture or mechanical break, horizontal, smooth, planar 29.05' - Fracture, 30 deg, smooth, planar			
			NR				
36.0	R3-HQ 5 ft 84%	40	1	31.9' - Fracture, 10 deg, smooth, planar	[Symbolic Log]	Limestone 36.8-37.1' - Fractures (2), horizontal, smooth, planar 37.45' - Fracture, 70 deg, rough, undulating 38.0' - Fracture, 10 deg, smooth, undulating 38.8, 39.3' - Fractures (2), horizontal, smooth, planar	R4: 2 minutes
40 1.7			2	32.2' - Fracture, 45 deg, smooth, undulating			
			3	32.7' - Fracture, vertical, rough, undulating 33.0-33.85' - Fracture zone, fine- to coarse-grained gravel			
			2	33.9' - Fracture, 70 deg, rough, undulating 34.2' - Fracture, 10 deg, rough, planar			
			0	34.8' - Fracture, 80 deg, rough, undulating			
41.0			NR				



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

WATER LEVELS : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
45 -3.3	R5-HQ 5 ft 62%	20	>10 4 2 0 NR	41.0-41.3' - Fracture zone 41.3' - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") 41.6' - Fracture zone, 20 deg, rough, planar, open 41.7' - Fracture zone, 70 deg, rough, planar, fracture terminates at 41.6' and 41.85', open 41.85' - Fracture zone, 30 deg, rough, stepped, fracture with some fragmentation, 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, 43.9' - 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 48.65' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, horizontal, smooth, undulating	39.3-39.7' - Same as 36.0-36.8' except weak (R2) No Recovery 39.7-41.0' Limestone 41.0-42.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 20-25% of rock surface, elongate fossil molds up to 1/5" over 5% of rock surface, few cavities up to 1/4", some gray to black inclusions 42.2-43.4' - Same as 41.0-42.2' except very weak to extremely weak (R1 to R0) 43.4-44.1' - Same as 41.0-42.2' No Recovery 44.1-46.0' Limestone 46.0-49.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids (1/16") over 20% of rock surface 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) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3)	R5: 2 minutes	
50 -8.3	R6-HQ 5 ft 78%	62	1 3 1 NR	51.0' - 1/4-inch infilling, strong HCl reaction	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 52.3-52.8' - Same as 51.0-52.3' except transition with depth from weak (R2) to extremely weak (R0) 52.8-54.75' - Same as 51.0-52.3' 54.75-55.3' - Same as 52.3-52.8' except possibly grades to stronger rock at 55.3'	R6: 2 minutes	
55 -13.3	R7-HQ 5 ft 86%	57	0 3 4 4 1 NR	52.3, 52.55, 52.7' - Fractures (3), horizontal, smooth, planar, open 53.2' - Fracture, vertical, rough, planar 53.3' - Fracture, 10 deg, smooth, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough, planar, open 54.1' - Fracture, 45 deg, smooth, undulating, tight 54.4' - Fracture, horizontal, rough, planar to undulating 54.75' - Fracture, 10 deg, rough, stepped, open 54.9, 55.2' - Fractures (2), horizontal, rough, planar, tight 56.6' - Fracture, horizontal and 45 deg, rough, undulating 57.3' - Fracture, 10 deg, rough, stepped, open 58.1' - Fracture, horizontal, rough, planar, open 58.5' - Fracture, 15 deg, rough, undulating 58.8' - Fracture, 35 deg, smooth, undulating, tight to open 59.7-59.8' - Fracture zone, 1/2" limestone rock fragments	No Recovery 55.3-56.0' Limestone 56.0-60.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong to very weak (R3 to R1), voids (1/16") over 25-30% of rock surface, some cavities up to 1/4", organic inclusions; very similar to R7-HQ No Recovery 60.0-61.0'	R7: 2 minutes	
60 -18.3	R8-HQ 5 ft 80%	58	1 1 3 3 NR			R8: 2 minutes	



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

WATER LEVELS : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
65 -23.3	R9-HQ 5 ft 92%	75	2	59.8' - Fracture, high angle fracture -- partially penetrating core		Limestone 61.0-61.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, very weak to extremely weak (R1 to R0), voids (1/16") over 3% of rock surface, few cavities up to 1/4" 61.4-61.6' - Fracture zone, horizontal, smooth, planar 61.7-63.4' - Same as 61.0-61.7' except medium strong to strong (R3 to R4), voids (1/16") over 5-10% of rock surface 63.4-64.3' - Same as 61.0-61.7' 64.3-65.4' - Same as 61.0-61.7' except weak to medium strong (R2 to R3), voids (1/16") over 5% of rock surface 65.4-65.6' - dark yellowish orange, (10YR 6/6), moderate HCl reaction, extremely weak (R0), voids and cavities absent No Recovery 65.6-66.0' Limestone 66.0-66.6' - dark yellowish orange, (10YR 6/6), moderate HCl reaction, extremely weak to very weak (R0 to R1), voids and cavities absent 66.6-70.1' - dark yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 5% of rock surface, voids (1/8") over 5% of rock surface No Recovery 70.1-71.0' Limestone 71.0-72.9' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface, few cavities up to 1/4" 72.9-73.5' - olive gray, (5Y 3/2), fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 3% of rock surface 73.5-75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (1/16") over 15% of rock surface, few cavities up to 1/4" No Recovery 75.0-76.0' Limestone 76.0-77.55' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very strong (R5), voids (1/16") over 5-10% of rock surface, few cavities from 1/4" up to 3/4", some cavity infilling	R9: 3 minutes
			0	63.45' - Fracture, horizontal, rough, planar			
			1	64.0-64.1' - Fracture zone			
			1	64.6' - Fracture, horizontal, smooth, planar, open			
			2	65.35, 65.45' - Fractures (2), 10 deg, smooth, planar			
			NR	66.1, 66.15, 66.35, 66.55' - Fractures (4), horizontal, smooth, planar, tight			
			5	66.6' - Fracture, horizontal, smooth, planar, open			
			2	67.6' - Fracture, horizontal, smooth, planar, tight to open			
			2	67.75' - Fracture, 75 deg, smooth, undulating			
			4	68.2' - Fracture, 75 deg, rough, undulating			
70 -28.3	R10-HQ 5 ft 82%	48	4	68.5-69.1' - Fracture zone, vertical and horizontal, smooth, undulating, angular limestone rock fragments		66.6-70.1' - dark yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 5% of rock surface, voids (1/8") over 5% of rock surface No Recovery 70.1-71.0' Limestone 71.0-72.9' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface, few cavities up to 1/4" 72.9-73.5' - olive gray, (5Y 3/2), fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 3% of rock surface 73.5-75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (1/16") over 15% of rock surface, few cavities up to 1/4" No Recovery 75.0-76.0' Limestone 76.0-77.55' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very strong (R5), voids (1/16") over 5-10% of rock surface, few cavities from 1/4" up to 3/4", some cavity infilling	R10: 3 minutes
			0	69.1' - Fracture, 20 deg, rough, undulating			
			NR	69.3' - Fracture, 20 deg, smooth, undulating, infilled with sediment			
			>10	69.75-70.1' - Fracture zone, vertical, rough, undulating, open			
			>10	71.0-71.2' - Fracture zone, subrounded fragments (up to 1 3/4")			
			6	71.25-71.35' - Fracture zone, horizontal, smooth, planar to undulating			
			2	72.1' - Fracture, horizontal, smooth, planar, tight			
			2	72.3-72.5' - Fracture zone, subangular fragments up to 1/2"			
			NR	72.5' - Fracture, 40 deg, rough, stepped			
			NR	72.8' - Fracture, horizontal, rough, undulating			
75 -33.3	R11-HQ 5 ft 80%	38	NR	73.0' - Fracture, 30 deg, rough, stepped		66.6-70.1' - dark yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 5% of rock surface, voids (1/8") over 5% of rock surface No Recovery 70.1-71.0' Limestone 71.0-72.9' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface, few cavities up to 1/4" 72.9-73.5' - olive gray, (5Y 3/2), fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 3% of rock surface 73.5-75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (1/16") over 15% of rock surface, few cavities up to 1/4" No Recovery 75.0-76.0' Limestone 76.0-77.55' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very strong (R5), voids (1/16") over 5-10% of rock surface, few cavities from 1/4" up to 3/4", some cavity infilling	Cavities at 73.9', 74.5'
			NR	73.0-73.2' - Fracture zone, angular fragments (up to 1/2")			
			0	73.4' - Fracture, 10 deg, rough, undulating, open			
			1	73.4' - Fracture, 10 deg, rough, undulating, open			
			1	74.1' - Fracture, 10 deg, smooth, planar, tight			
			2	74.9' - Fracture, 50 deg, rough, stepped, open			
			2	77.6' - Fracture, horizontal, rough, planar			
			2	78.0' - Fracture, 10 deg, rough, undulating			
			3	78.9' - Fracture, horizontal, smooth, planar			
			7	79.15, 79.35, 79.65' - Fractures (3), horizontal, rough, planar, open at 79.15'			
80 -38.3	R12-HQ 5 ft 88%	45	NR	80.15-80.4' - Fracture zone, subangular fragments (up to 2")		66.6-70.1' - dark yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 5% of rock surface, voids (1/8") over 5% of rock surface No Recovery 70.1-71.0' Limestone 71.0-72.9' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface, few cavities up to 1/4" 72.9-73.5' - olive gray, (5Y 3/2), fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 3% of rock surface 73.5-75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (1/16") over 15% of rock surface, few cavities up to 1/4" No Recovery 75.0-76.0' Limestone 76.0-77.55' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very strong (R5), voids (1/16") over 5-10% of rock surface, few cavities from 1/4" up to 3/4", some cavity infilling	R12: 3 minutes
			NR				
			NR				
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -43.3	R13-HQ 5 ft 84%	78	1	81.1' - Fracture, horizontal, rough, undulating		77.5-78.9' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, extremely weak (R0), with very fine carbonate-derived sand and silt 78.9-80.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 25% of rock surface, some cavities 1/4"-1/2", trace organic inclusions No Recovery 80.4-81.0' Limestone 81.0-83.15' - dark yellowish orange to dusky yellow, (10YR 6/6 to 5Y 6/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 15-20% of rock surface, few cavities up to 1/4" 83.15-85.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 25-30% of rock surface with cavities up to 3/4", some cavities infilled with less strong, gray to brown, limestone No Recovery 85.2-86.0' Limestone 86.0-87.5' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, extremely weak (R0), voids (1/16") over up to 3% of rock surface 87.5-88.7' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, weak to medium strong (R2 to R3), voids (1/16"-1/8") over 20% of rock surface, few cavities 1/2"-3/4", cavities mostly elongate 88.7-90.5' - yellowish gray, (5Y 8/1), fine to very fine grained, strong HCl reaction, very weak to very strong (R1 to R5), fossiliferous (less than 1/16"), rock strength gradually transitions from weak (R2) at 88.7-89.1' to extremely weak (R0) at 89.1-89.7' to strong to very strong (R4 to R5) at 89.7-90.5' No Recovery 90.5-91.0' Limestone 91.0-91.6' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), angular to subangular limestone rock fragments (1/2"-2"), no fines 91.6-91.9' - Same as 88.7-90.5' except yellowish gray, (5Y 8/1) No Recovery 91.9-96.0'	SC-1 collected at 81.2-82.3' Cavities at 83.7', 84.0', 84.1', 84.4' (less than 1/4") R13: 3 minutes
			0				
			0	84.0' - Fracture, 40 deg, rough, stepped			
			1	85.0' - Fracture, 45 deg, rough, undulating			
			NR				
	90 -48.3	R14-HQ 5 ft 90%	20	2			86.3' - Fracture, 10 deg, rough, planar 86.6' - Fracture, 10 deg, rough, stepped
				>10			87.1-87.5' - Fracture zone, angular fragments (3/4 to 2")
				3			88.0' - Fracture, 30 deg, rough, undulating, tight 88.65' - Fracture, 40 deg, rough, undulating, open
				>10			88.85' - Fracture, vertical, rough, undulating, tight
				2			89.1' - Fracture, horizontal, rough, stepped, open
NR				89.2-89.4' - Fracture zone, angular fragments (1/2 to 1"), terminated by rough-planar horizontal fracture			
NR				89.7' - Fracture, 10 deg, rough, undulating to stepped, tight to open			
95 -53.3	R15-HQ 5 ft 18%	0	>10	90.0' - Fracture, 80 deg, rough, undulating, tight to open 90.3' - Fracture, horizontal, rough, planar, tight			
			NR	91.0-91.6' - Fracture zone, angular to subrounded fragments 1/2" to 2"			
			NR	91.6' - Fracture, 30 deg, rough, undulating, open			
			0				
			0				
100 -58.3	R16-HQ 5 ft 4%	0	NR				
			NR				
101.0							



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
 WATER LEVELS : 7.0 ft bgs on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -63.3	R17-HQ 5 ft 96%	80	2	101.3' - Fracture or mechanical break, 30 deg, rough, stepped 101.7' - Fracture, horizontal, smooth, planar, tight	Limestone 96.0-96.2' - light olive gray, (5Y 5/2), very fine grained, moderate to strong HCl reaction, very strong (R5), voids (1/16") over 5% of rock surface No Recovery 96.2-101.0' Limestone 101.0-105.8' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, extremely weak (R0) from 101.0-101.5', very weak (R1) from 101.5-105.8', trace to 5% fine, gray speckles in matrix No Recovery 105.8-106.0' Limestone 106.0-111.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, very weak to extremely weak (R1 to R0), very small fossil fragments 111.0-115.7' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 3% of rock surface, few cavities up to 1/4", increase in voids to 10% with some cavities up to 1/2" below 115.3' No Recovery 115.7-116.0' Limestone 116.0-118.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), voids (1/16") over 3% of rock surface, bioturbated 118.5-119.8' - Same as 116.0-118.5' except yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine grained limestone with some textural and color variations 119.8-120.7' - Same as 116.0-118.5' No Recovery 120.7-121.0'	SC-2 collected at 102.3-103.4'	
			0				
			1	103.4' - Fracture, horizontal, rough, undulating			
			0				
			4	105.3, 105.4, 105.5, 105.65' - Fractures (4), horizontal - 20 deg, smooth, planar, open			R17: 3 minutes
			NR				
			2	106.1, 106.3' - Fractures (2), horizontal, smooth, planar, tight			
			1	107.1' - Fracture, horizontal, smooth, undulating, open			
			1	108.3' - Fracture, 10 deg, smooth, planar, tight			
			2	108.65, 109.2' - Fracture, horizontal, smooth, undulating, tight			
110 -68.3	R18-HQ 5 ft 100%	78	5	109.9' - Fracture, 10 deg, smooth, undulating, open		R18: 5 minutes	
				110.0, 110.05, 110.2, 110.35' - Fractures (4), horizontal, smooth, undulating		Drilling ends at 16:30 on 6/5/07	
				110.6' - Fracture or mechanical break, horizontal, smooth, planar		Core tends to break along bedding planes, very uniform lithology throughout core	
				111.0-111.2' - Fracture zone, subrounded fragments 1/2" to 2"		Start drilling on 6/6/07 at 08:30	
			2	111.2-111.4, 111.9, 112.3, 112.95' - Fractures (5), horizontal, smooth, planar to undulating, tight			
			1	113.3, 114.4' - Fractures (2), horizontal, smooth, undulating			
			2				
115 -73.3	R19-HQ 5 ft 94%	85	0	114.9' - Fracture, 5 deg, rough, undulating		R19: 2 minutes	
			NR				
			1	116.25' - Fracture, horizontal, rough, undulating		SC-3 collected at 116.3-117.5'	
			2	117.4, 117.6' - Fractures (2), 5 deg, rough, stepped			
			2	118.3, 118.6' - Fractures (2), horizontal, rough, undulating		Cavities at 117.2', 120.2'; sample tends to break along bedding planes when handled, rock in core uniform throughout	
			4	119.3' - Fracture, 30 deg, rough, planar, tight		R20: Run time not recorded	
			2	119.5' - Fracture, 80 deg, rough, undulating, fracture extends from 119.3-119.75'			
120 -78.3	R20-HQ 5 ft 94%	67	NR				
			NR				



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 on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -83.3	R21-HQ 5 ft 100%	80	2	119.55, 119.75' - Fractures (2), horizontal, smooth to rough, planar to undulating, tight to open	[Symbolic Log]	Limestone 121.0-126.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), voids (1/16") over 3-5% of rock surface, few cavities (1/4"-1/2"), some cavities infilled with white calcareous limestone, some textural and color variations similar to 118.5-119.8' from 121.35-122.0', fossiliferous, inclusions at 122.6' 126.0-131.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), voids (1/16") over 3% of rock surface, few cavities up to 1/4" from 126.0-127.5', voids (1/16") over 30% of rock surface, many shallow cavities (1/4"-1/2"), fossiliferous, elongate molds and casts (1/2"-3/4") from 127.5-129.15' 131.0-135.7' - Same as 126.0-131.0 except voids (1/16") over 30% of rock surface from 131.0-131.8'; thin laminae with bedding planes from 132.6-133.3'; thicker brown laminae (1/16"-1") from 134.7-135.1' No Recovery 135.7-136.0' Limestone 136.0-139.6' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), brown laminations from 137.3-137.8'	Fossiliferous inclusions at 122.6', cavity at 123.65' (1"), cavities at 125.1' and 125.8' (1/4"-1/2"), partial white infilling of cavities could also be actual fossil R21: 3 minutes Large bivalve shells at 127.4', 127.5', 126.7' R22: Run time not recorded SC-4 collected at 130.1-131.0' R23: 3 minutes Cavities at 139.55', 139.5', 139.9', 140.0', 140.1', 140.2', 140.5', 140.6' (up to 1")	
			0	120.4, 120.6, 121.3, 121.4' - Fractures (4), horizontal, smooth, planar				
			4	123.1' - Fracture, horizontal, smooth, planar to undulating, open				
			2	123.25' - Fracture, horizontal, smooth, stepped, open				
			1	123.35, 123.45' - Fractures (2), horizontal, smooth, planar to undulating, open				
	130 -88.3	R22-HQ 5 ft 100%	85	6				124.5, 124.6' - Fractures (2), horizontal, smooth, planar
				1				125.5' - Fracture, horizontal, smooth, planar, tight
				0				126.1' - Fracture, horizontal, smooth, planar, open
				6				126.2' - Fracture, 30 deg, smooth, planar, open
				2				126.75' - Fracture, horizontal, smooth, planar, open
135 -93.3	R23-HQ 5 ft 94%	47	0	127.8' - Fracture, horizontal, rough, undulating, tight				
			6	129.1-129.6' - Fracture zone or bedding plane, smooth, planar, some ridging				
			2	129.1-129.6' - Fractures (2), horizontal, smooth, planar				
			3	131.2, 131.5, 131.6' - Fracture zone (3), horizontal, rough, undulating				
			3	132.5' - Fracture, 5 deg, smooth, undulating				
140 -98.3	R24-HQ 5 ft 92%	47	2	132.9, 132.95, 133.1, 133.9, 134.5, 134.7, 134.8' - Fractures (7), horizontal, smooth, planar				
			3					
			2	135.2, 135.35' - Fractures (2), horizontal, smooth, undulating				
			NR					
			4	136.1' - Fracture, 80 deg, rough, planar				
			2	136.25-136.4' - Fracture zone, irregular subrounded fragments up to 2-1/2", bounded by horizontal, smooth planar fractures				
			2	136.95' - Fracture, 80 deg, smooth, planar, tight				
141.0	NR	NR	2	137.1' - Fracture, horizontal, smooth, undulating, tight				
			5	137.9' - Fracture, horizontal, smooth, planar, tight				
			2	138.25, 138.8' - Fractures (2), horizontal, smooth, planar				
			NR	139.1' - Fracture, horizontal, rough, planar, open to tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-14	SHEET 9 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 on 6/5/07 START : 6/5/2007 END : 6/6/2007 LOGGER : B. Ellis, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -103.3	R25-HQ 5 ft 78%	48	1	139.3' - Fracture, horizontal, rough to smooth, planar to undulating, open	139.6-140.6' - yellowish gray to grayish orange, (5Y 8/1 to 10YR 7/4), fine grained, strong HCl reaction, strong (R4), voids (1/16") over 3% of rock surface, numerous deep cavities (1/2"-3/4") fully penetrating core No Recovery 140.6-141.0' Limestone 141.0-144.9' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong HCl reaction, strong (R4), voids (1/16") over 5-10% of rock surface, many elongate cavities (1/4"x1/2") with some infilling from 141.0-143.4; voids (1/16") over 0-5% of rock surface, few to no cavities from 143.4-144.9' No Recovery 144.9-146.0' Limestone 146.0-149.2' - dark yellowish orange, (10YR 6/6), fine to medium grained, strong HCl reaction, weak (R2), voids (1/16") over 30% of rock surface, some fine laminations 149.2-150.9' - moderate olive brown, (5Y 4/4), fine to very fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 3% of rock surface, rare cavities (up to 1/4"), trace organic inclusions No Recovery 150.9-151.0' Bottom of Boring at 151.0 ft bgs on 6/6/2007	R24: 4 minutes Cavities at 141.0', 141.35', 141.4', 141.75', 142.1', 142.7', 143.1'	
			>10	139.45' - Fracture, 50 deg, rough, undulating			
			>10	139.7' - Fracture, 40 deg, rough, undulating			
			0	139.9' - Fracture, vertical, rough, planar			
			NR	140.1' - Fracture, 70 deg, rough, undulating			
			1	140.25' - Fracture, 50 deg, rough, undulating			
			0	141.6' - Fracture, 30 deg, rough, undulating to stepped, tight			
			1	142.3-142.5, 142.8-142.9, 143.2-143.3' - Fracture zone (3), subangular fragments (up to 1 1/2"), bounded by 10 deg, rough, planar fractures			SC-5 collected at 143.8-144.8'
			0	143.5' - Fracture, horizontal, smooth, undulating			R25: Run time not recorded
			1	143.9' - Fracture, horizontal, rough, undulating			
150 -108.3	R26-HQ 5 ft 98%	75	1	146.3' - Fracture, 45 deg, smooth, planar			
			4	148.35, 149.15, 149.2' - Fractures (3), horizontal, smooth, planar			
			4	149.4' - Fracture, 80 deg, smooth, undulating			
			4	149.6' - Fracture, horizontal, smooth, planar			
			NR	150.0' - Fracture, 80 deg, rough, undulating		R26: 4 minutes	
			NR	150.3' - Fracture, vertical, rough, undulating			
			NR	150.55' - Fracture, horizontal, rough, undulating			



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
 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 : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
42.3	0.0	1.0	SS-1	1-1-1 (2)	Silty Sand (SM) 0.0-1.0' - moderate yellowish brown, (10YR 5/4), moist, very loose, very fine to fine grained, 15% fines, 15% nonplastic fines, organics and rootlets, decreasing with depth	| | | | |	Sand is silica
	1.5					| | | | |	
5	5.0	1.1	SS-2	3-4-5 (9)	Clayey Sand (SC) 5.0-6.1' - greenish gray, (5GY 6/1), wet, loose, very fine to fine grained, medium to high plasticity, trace very fine grain black particles, trace rootlets, 35-40% plastic fines	| | | | |	Water level approximately 4.0' below ground surface
37.3	6.5					| | | | |	
10	10.0	1.0	SS-3	23-9-7 (16)	Silt And Limestone Fragments (ML) 10.0-11.0' - moderate yellow, (5Y 7/6), wet, stiff, nonplastic, very rapid dilatancy, moderate HCl reaction, interbedded with 1/8" thick limestone lenses and 1" limestone fragments	| | | | |	Driller's Remark: Complete circulation loss at 10.5' below ground surface
32.3	11.5					| | | | |	
15	15.0	0.2	SS-4	50/2.5 (50/2.5")	Silt And Limestone Fragments (ML) 15.0-15.2' - Same as 10.0-11.0'	| | | | |	
27.3	15.2					| | | | |	
20						| | | | |	Driller's Remark: Will install 4" HW casing to 19.0' below ground surface



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-15	SHEET 2 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
 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 : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.3	20.0	1.0	SS-5	10-32-50/4 (82/10")		
	21.3					
25	25.0					
17.3	25.9	0.8	SS-6	25-50/4.5 (75/10.5")		
30	30.0					
12.3	30.3	0.2	SS-7	50/3.5 (50/3.5")		
35	35.0					
7.3	35.2	0.0	SS-8	50/2 (50/2")		Driller's Remark: Will install 4" HW casing down to 35.0' below ground surface
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-15	SHEET 3 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
 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 : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
2.3	40.0	0.8	SS-9	44-50/5 (94/11")	Silt With Sand (ML) 40.0-40.8' - light olive brown, (5Y 5/6), wet, hard, fine to coarse grained, 20-30% sand, nonplastic, rapid dilatancy, mild HCl reaction, 5-10% organics, all carbonate		
	40.9						
45	45.0						
-2.7	45.3	0.1	SS-10	50/3.5 (50/3.5")	Limestone Fragments 45.0-45.1' - moderate olive brown, (5Y 4/4), mild to moderate HCl reaction, 10% fine grain, black particles in rock matrix, poor recovery, highly fossiliferous		
50	50.0						
-7.7	50.2	0.0	SS-11	50/2 (50/2")	No Recovery 50.0-50.2'		
55	55.0						
-12.7	55.3	0.1	SS-12	50/4 (50/4")	Limestone Fragments 55.0-55.1' - medium olive brown, (5Y 4/4), medium grained, mild to moderate HCl reaction, trace medium grain-sized black particles, moderately fossiliferous (casts, molds up to 5/8")		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-15	SHEET 4 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
 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 : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.7	60.0	0.7	SS-13	45-50/3.5 (95/9.5")	Silty Sand And Limestone Fragments (SM) 60.0-60.7' - moderate olive brown, (5Y 4/4), wet, very dense, fine to coarse grained, 20-25% fines, low plasticity, mild to moderate HCl reaction, 40% fine gravel-sized limestone, poorly fossiliferous Begin Rock Coring at 61.0 ft bgs See the next sheet for the rock core log	Driller's Remark: Will install 4" HW casing down to 61.0' below ground surface	
60.8							
65 -22.7							
70 -27.7							
75 -32.7							
80							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
61.0	R1-NQ 5 ft 54%	35	3	61.35' - Mechanical break	Limestone 61.0-63.7' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2), moderate to strong HCl reaction, medium strong (R3), 15% voids <1/16", infilled cavities with dark gray material (N3) No Recovery 63.7-66.0'	R1: 16 minutes	
65 -22.7			2	61.75, 61.9, 61.95' - Bedding plane (3), horizontal, rough, undulating, <1/16" gap, possible mechanical break			
66.0			2	63.0, 63.4' - Bedding plane (2), 5 deg and 10 deg, rough, undulating, open up to 3/16", fracture is through infilled cavity, possible mechanical break			
			NR				
70 -27.7	R2-NQ 5 ft 74%	53	2	66.1' - Bedding plane, horizontal, rough, undulating, open 1/16"	Limestone 66.0-69.7' - Same as 61.0-63.7' except olive gray, (5Y 3/2), trace fossil casts, weak rock interval from 69.0-69.7' No Recovery 69.7-71.0'	SC-1 collected at 67.9-68.75' Driller's Remark: Last 14" of run was very soft R2: 16 minutes	
71.0			2	66.55, 68.75, 69.0' - Bedding plane (3), horizontal, rough, undulating, tight, possible mechanical break			
			2	67.15, 67.9' - Bedding plane (2), 5 deg and 10 deg, rough, undulating, tight, possible mechanical break			
			3	68.75, 69.0' - Bedding plane (2), horizontal, rough, undulating, tight			
			NR	69.25' - Fracture, 10 deg and 15 deg, rough, undulating, tight 69.55, 69.65' - Fracture (2), horizontal and 5 deg, tight, fractures are in weak rock interval			
75 -32.7	R3-NQ 5 ft 62%	38	NR	72.9-73.35' - Fracture zone, subangular and rounded fragments up to 1-3/8" in size 73.35-74.1' - Joint, vertical	Limestone 72.9-76.0' - moderate olive brown grading at 74.7' to light olive brown, (5Y 4/4 grading to 5Y 5/6), strong HCl reaction, medium strong to weak (R3 to R2), 15% voids <1/16" on surface in creasing to 30% from 74.7' with depth, poorly fossiliferous (casts), trace unfilled cavities to 3/8"x3/16" elongated, bioturbated areas 3% irregularly shaped cavities >1", trace dark gray infill fines 76.0-81.0' - yellowish gray to light olive brown, (5Y 8/1 to 5Y 5/6), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 30-35% voids <1/16", poorly fossiliferous (casts), 3-5% dark gray fine to medium grained particles	R3: 17 minutes	
76.0			1	74.1' - Fracture, horizontal, rough, undulating, open 1/16", broken across infilled void, black stain			
			3	75.3, 75.5, 75.7' - Fractures (3), 10 deg and 15 deg, rough, undulating, tight, possible mechanical break			
			2	76.1' - Bedding plane, horizontal, smooth, stepped, tight, possible mechanical break 76.9' - Fracture, 5 deg and 10 deg, rough, undulating, open 1/16"			
80 -37.7	R4-NQ 5 ft 100%	84	3	78.05' - Fractures, 15 deg and 20 deg, rough, undulating, tight, possible mechanical break 78.45' - Fracture, horizontal, rough, undulating, tight to 1/2" open		SC-2 collected at 76.9-78.05'	
81.0			2	78.7' - Fracture, horizontal, rough, undulating, up to 3/4" open			
			1	79.4, 79.5' - Bedding plane (2), horizontal, rough, undulating, open 1/8", possible mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-15
SHEET 6 OF 9	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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

WATER LEVELS : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION	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.	
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
85 -42.7	R5-NQ 5 ft 100%	88	0	80.2' - Fracture, horizontal, rough, undulating, tight, possible mechanical break		[Symbolic Log]	Limestone 81.0-86.0' - light olive brown, (5Y 6/6), strong HCl reaction, weak (R2), 10-15% mottled yellowish gray (5Y 8/1) with olive gray (5Y 5/2), moderately fossiliferous (casts/molds), carbonate fines (irregularly shaped fines possible bioturbation), trace organic lenses to 3/8" thick at 82.15' and 82.5', fossils to 9/16" predominately horizontally oriented and rice shaped with corrugated patterns	R5: 13 minutes
			3	82.15, 82.5' - Bedding plane (2), horizontal, rough, undulating, open 7/16", dry, fine laminations				
			0	82.8' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break				
			2	84.35' - Bedding plane, horizontal, rough, undulating, tight, in very weak rock, possible mechanical break				
			0	84.6' - Bedding plane, horizontal, fracture in bioturbated zone, possible mechanical break				
86.0	R6-NQ 5 ft 94%	54	6	86.05, 86.2, 86.35, 86.45, 86.5, 86.7' - Bedding plane (6), 0 deg to 5 deg, rough, undulating, 1/16" gap, possible mechanical break		[Symbolic Log]	86.0-86.35' - Same as 81.0-86.0' 86.35-90.7' - white to yellowish gray with medium dark gray and moderate yellow, (5Y 8/1 with N4 and 5Y 7/6), very fine grained, strong HCl reaction, strong (R4), very fossiliferous (casts, microforams), trace spherical voids <1/16", bioturbated mottling 30-35% of surface with 15-20% voids <1/16"	R6: 21 minutes
			0					
			2	88.1, 88.5' - Fracture (2), horizontal, rough, undulating, tight, possible mechanical break				
			3	89.1' - Bedding plane, horizontal				
			2	89.4' - Bedding plane, horizontal, possible mechanical break				
90 -47.7	R7-NQ 5 ft 98%	60	NR	89.55' - Fracture, vertical, rough, undulating, gray staining, tight, with bisecting mechanical breaks		[Symbolic Log]	No Recovery 90.7-91.0' Limestone 91.0-95.9' - yellowish gray with dark gray and white, (5Y 7/2 with N3 and N9), strong HCl reaction, weak (R2), very fossiliferous (casts, molds, shells) fossils to 7/8", 94.0-95.9' apparent bedding and horizontal fossil alignment	R7: 10 minutes
			4	90.0' - Fracture, horizontal, rough, undulating, 1/8" open				
			3	90.4' - Fracture, horizontal, rough, undulating, tight				
			3	91.4, 91.5, 91.7, 91.95, 92.15, 92.4' - Fractures (6), horizontal, rough, undulating, tight, possible mechanical break				
			2	92.95, 93.25, 93.5' - Fractures (3), 5 deg to 10 deg, rough, undulating, tight, possible mechanical break				
95 -52.7	R8-NQ 5 ft 100%	95	2	93.75' - Fracture, 30 deg, rough, undulating, tight		[Symbolic Log]	No Recovery 95.9-96.0' Limestone 96.0-101.0' - Same as 91.0-95.9' except medium-sized white (N9) and dark gray (N3) grains	R8: 9 minutes
			2	94.4, 94.6, 95.2, 95.6' - Fractures (4), 0 deg to 5 deg, rough, undulating, tight, possible mechanical break				
			1	96.6' - Fracture, 45 deg, rough, undulating, tight				
			1	97.95' - Fracture, horizontal, rough, undulating, open 3/4"				
			2	98.2' - Fracture, 55 deg, rough, undulating, tight				
100 -57.7	R8-NQ 5 ft 100%	95	1	98.5' - Mechanical break		[Symbolic Log]		
			1	98.65' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break				
			1	99.6' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.7	R9-NQ 5 ft 100%	84	2	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	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 -67.7	R10-NQ 5 ft 100%	65	3	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 109.1' - Bedding plane, horizontal, bedded fossil casts and molds 110.5' - Bedding plane, horizontal, rough, undulating, tight, hard mineral surface			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'	R10: 8 minutes
115 -72.7	R11-NQ 5 ft 70%	28	2	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 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	111.0-114.5' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, very weak (R1), very fossiliferous (microforams, shells, molds) fossils >75% of rock to 1/16" trace to 1" No Recovery 114.5-116.0'	R11: 9 minutes	
120 -77.7	R12-NQ 5 ft 100%	46	NR	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, horizontal, tight, in friable rock 118.3, 118.6' - Fracture, vertical, rough, undulating, tight 118.85-119.1' - Fracture zone	Limestone 116.0-121.0' - Same as 111.0-114.5'	R12: 11 minutes	



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
 WATER LEVELS : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -82.7	R13-NQ 5 ft 86%	61	2	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, 124.9, 125.2' - Bedding plane or mechanical break (8), horizontal, rough, undulating, tight, fractures through cavities at 125.2' and 123.05'		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 to 10 deg, possible trace fine quartz sand No Recovery 125.3-126.0'	R13: 10 minutes
130 -87.7	R14-NQ 5 ft 100%	41	7	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 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, tight 129.55' - Bedding plane, horizontal, rough, undulating, tight		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 grained, strong HCl reaction, very weak (R1), thin bedding, grain size alternates 127.5-129.0' medium to coarse grained, very fossiliferous	R14: Run time not recorded
135 -92.7	R15-NQ 5 ft 96%	88	0	132.0' - Bedding plane, 20 deg, rough, undulating, tight 132.45' - Fracture or mechanical break, horizontal, rough, undulating 132.95' - Bedding plane or mechanical break, 10 deg to 15 deg, rough, undulating, tight		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 (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 134.4'	SC-4 collected at 131.0-132.0'
140 -97.7	R16-NQ 5 ft 96%	62	2	134.35' - Bedding plane, 5 deg, rough, undulating, 1/32" silt and/or clay sized infilling, open 1/16" 134.4' - Fracture, undulating, tight 134.9' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 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 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, horizontal, rough, undulating, tight, fracture in bioturbated cavity 137.65' - Bedding plane or mechanical break, 20 deg, rough, undulating, tight		No Recovery 135.8-136.0' 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 to 1/4" with thin halo on edges, clasts strong rock (R4), strongly suggests possible fluvial deposition	R15: 12 minutes
			NR				R16: 18 minutes



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-15	SHEET 9 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
 WATER LEVELS : 4.0 ft bgs on 5/15/07 START : 5/15/2007 END : 5/17/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -102.7	R17-NQ 5 ft 94%	70	1	137.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, fracture through bioturbated cavity	Limestone 136.5-138.5' - light olive gray, (5Y 5/2), very fine grained, strong HCl reaction, medium strong (R3), 3-5% voids <1/32", 5% irregularly shaped cavities >2" (bioturbation pockets) with 25-30% voids <1/16" and mottling of moderate yellow rimming, moderate yellow infill, poorly fossiliferous (casts, molds) 138.5-140.3' - light olive gray, (5Y 5/2), very fine grained, strong HCl reaction, medium strong (R3), moderately fossiliferous (casts, molds) increase abundance with depth, 5% infilled irregularly shaped cavities to 1" with black staining, 3-5% mottling, trace elongated cavities to 3/8"x3/16" 140.3-140.8' - light olive gray, (5Y 5/2), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), black (<1/32" thick) microlaminations dipping 20-25 deg, trace voids <1/32" No Recovery 140.8-141.0' Limestone 141.0-142.2' - Same as 140.3-140.8' 142.2-145.7' - yellowish gray with grayish orange and light gray, (5Y 8/1 with 10YR 7/4, N6), fine to medium grained, strong HCl reaction, weak (R2), moderately fossiliferous (casts, shells), fossils horizontally aligned, grayish orange grains have a frosted to translucent luster No Recovery 145.7-146.0' Limestone 146.0-151.0' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), very fine to fine grained, strong HCl reaction, medium strong (R3), poorly fossiliferous (casts), 3-5% spherical voids <1/16", 149.2-150.1' weak rock zone of fine to medium grained laminated material alternating yellowish gray and moderate olive brown (5Y 8/1 and 5Y 4/4), 149.2-150.1' similar to 142.2-145.7' No Recovery 150.8-151.0' Bottom of Boring at 151.0 ft bgs on 5/17/2007	SC-5 collected at 141.0-141.8' R17: 11 minutes 13:12 water level in HW casing 6.7' below ground surface End configuration 4" HW to 56.0' below ground surface NQ from 61.0-151.0' below ground surface Soil/split spoon from 0.0-60.0' Abandonment: 16 bags of type I/II Portland cement Mixed with 37 gallons of water Plus 3 dry bags of Portland R18: 16 minutes	
			3	138.1' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to 1" open			
			0	138.7' - Fracture zone, 2" wide with 1/2" to 1-1/2" fragments			
			2	139.1' - Fracture or mechanical break, horizontal, rough, undulating, tight organics on 50% of surface			
			3	139.7' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
146.0			NR	139.8' - Bedding plane or mechanical break, 20 deg, rough, undulating			
			1	140.3' - Bedding plane, rough, stepped, tight to 1/16" open, parting along wavy lamination			
			0	141.8-145.55' - Bedding plane or mechanical break (6), horizontal, rough, planar, tight			
			2	142.0' - Fracture, 70 deg to 80 deg, rough, undulating, tight			
150 -107.7	R18-NQ 5 ft 96%	54	8	142.25' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/2"-1-3/8" open			
			2	144.8' - Fracture, 60 deg, rough, undulating, tight			
			NR	146.1' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/16" open			
			NR	146.5-147.4' - Fracture, healed			
			NR	148.3' - Bedding plane, horizontal, smooth, stepped, tight			
			NR	148.65' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16" open			
			NR	149.0, 149.15' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/16" open			
			NR	149.2-149.8' - Bedding plane (6), horizontal, rough, undulating, 1/16" open			
			NR	150.1' - Fracture or mechanical break, 5 deg to 10 deg, rough, planar, tight			
			NR	150.6' - Bedding plane or mechanical break, horizontal, rough, undulating, tight			



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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
42.6	0.0	1.0	SS-1	0-2-3 (5)	Topsoil 0.0-0.2' - wood chips Poorly Graded Sand (SP) 0.2-1.0' - medium light gray, (N6), moist, loose, fine grained, nonplastic, no HCl reaction, trace fine organics, and rootlets, sand is silica		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)"
	1.5						
5 37.6	5.0	1.2	SS-2	3-5-4 (9)	Poorly Graded Sand (SP) 5.0-6.2' - pale yellowish gray, (5Y 8/1), some mottling, moist to wet, loose, fine grained, nonplastic, no HCl reaction, trace organics and black mineral, trace pyrite nodules, sand is silica		
	6.5						
10 32.6	10.0	1.3	SS-3	0-1-2 (3)	Silty Sand (SM) 10.0-10.2' - light olive gray, (5Y 6/1), wet, very loose, fine grained, low plasticity, no HCl reaction, sand is silica Silty Sand With Gravel (SM) 10.2-11.3' - yellowish gray, (5Y 8/1), wet, very loose, fine to coarse grained, strong HCl reaction, 15% sand-sized carbonate material, 15% gravel-sized carbonate material, fossil fragments		10.0-10.2' slough Driller's Remark: Hard material at 11.5' below ground surface
	11.5						
15 27.6	15.0	0.8	SS-4	11-15-11 (26)	Limestone Fragments 15.0-15.1' - mottled yellowish gray and dark yellowish orange, (5Y 7/2 and 10YR 6/6), dense, coarse grained, coarse gravel-sized limestone, strong HCl reaction Silt With Sand (ML) 15.1-15.8' - grayish orange, (10YR 7/4), moist to wet, very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 15-20% very fine sand, carbonate materials		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.6	20.0	1.2	SS-5	13-17-20 (37)	Silt With Sand (ML) 20.0-21.2' - Same as 15.1-15.8' except 25% very fine sand, fine gravel-sized limestone at top of sample		
	21.5						
25	25.0	0.9	SS-6	26-50/5 (76/11")	Sandy Silt (ML) 25.0-25.9' - grayish orange, (10YR 7/4), moist to wet, hard, fine to coarse grained, 30% fine to coarse sand-sized carbonate material, fine to coarse gravel-sized limestone from 25.0'-25.4'		Gray silica sand and white carbonate fragments in sample, assume slough from upper material
17.6	25.9						
30	30.0	0.9	SS-7	3-36-13 (49)	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 reaction, 25% fine sand-sized, trace medium to coarse sand-sized, trace fine gravel-sized, all carbonate materials		
12.6	31.5						
35	35.0	1.3	SS-8	8-12-19 (31)	Silty Sand (SM) 35.0-36.3' - grayish orange, (10YR 7/4), moist to wet, dense, fine to coarse grained, 46% fines, all carbonate		
7.6	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-16	SHEET 3 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
2.6	40.0	0.7	SS-9	43-50/6 (93/12")		
	41.0					
						Driller's Remark: Hard material at 43.5' below ground surface
45	45.0	0.0	SS-10	50/0.5 (50/0.5")		
-2.4						No Recovery 45.0-45.04'
						Begin Rock Coring at 46.0 ft bgs See the next sheet for the rock core log
50						
-7.4						
55						
-12.4						
60						



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
 WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
46.0	R1-NQ 5 ft 100%	95	2	46.2' - 70 deg, smooth, undulating, up to 0.4" gap		Limestone 46.0-48.5' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), 25% surface void (1/16"), many cavities up to 9/16"x3/16", moderately fossiliferous with fossil molds 48.5-51.0' - Same as 46.0'-48.5' except 40% surface voids (1/16"), very many cavities up to 3/4" diameter, highly fossiliferous with fossil molds, mostly oblong up to 9/16"x1/8"	SC-1 collected at 47.5-48.4'
			0	46.65' - Bedding plane, horizontal, undulating, bedding plane fracture, smooth to rough, tight up to 0.1" gap			
			1	48.5' - 20 deg, rough, undulating			
50 -7.4			0				
			0				
51.0	R2-NQ 5 ft 64%	0	4			51.0-53.55' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, extremely weak (R0), very weakly cemented 53.55-53.7' - Same as 51.0'-53.55' except 0-5% surface void up to 1/16", few cavities up to 9/16" diameter, poorly fossiliferous, trace black fine to medium grained material 53.7-54.2' - Same as 51.0'-53.55' No Recovery 54.2-56.0'	R1: 8 minutes
			3	50.22, 54.05' - Mechanical break (10), 0 - 20 deg, rough, undulating, infilling, bedding plane fracture probably mechanical break, all have infill due to soft nature of rock fracture surfaces eroding, up to 0.04" gap due to rock surface eroding off/breaking			
			3				
55 -12.4			>10				
			NR				
56.0	R3-NQ 5 ft 88%	30	3	56.15, 56.7, 56.9, 57.0, 57.25, 57.5, 58.05, 58.15, 58.2, 58.3, 59.5, 59.8' - Mechanical break (12), 10 deg, smooth, undulating, infilling, bedding plane fracture or mechanical breaks, smooth to rough, planer to undulating, tight to 3/4" thick gap, infill from eroding fracture surface due to soft quality of rock		Limestone 56.0-60.4' - yellowish gray, (5Y 7/8), strong HCl reaction, extremely weak (R0), up to 1/2" thick bands of recrystallization from 59.1-59.3' and 60.1-60.4' were very weak rock, weakly cemented, voids (<1/16") on surface, 0% from 56.0-58.6', 5-25% voids from 50.8-60.4', cavities (molds) up to 3/16"x3/8", black lineations up to 1/8" from 60.0-60.4', fine grained, trace medium grained No Recovery 60.4-61.0'	R2: 3 minutes
			3	58.1, 58.5' - very weakly cemented rock			
			>10				
60 -17.4			>10	59.9, 60.1' - Fractures, rock fragments zone, black staining at 60.1' fracture surface			
			NR				
61.0	R4-NQ 5 ft 76%	8	>10	61.0-61.6' - Fracture zone		Limestone 61.0-62.4' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, extremely weak (R0), small voids (1/16") cover 25% of core surface, many cavities up to 3/8" diameter and 9/16"x3/8", some cavities are fossil molds, black material up to 3/8" and black lineation up to 3/16" from 61.0-61.65' 62.4-64.8' - Same as 61.0'-62.4' except very weak (R1) No Recovery 64.8-66.0'	R3: 5 minutes
			>10	61.7' - Bedding plane or mechanical break, horizontal, rough, undulating, undulating to stepped up to 1" gap			
			>10	62.15, 62.25, 62.4' - Bedding plane or mechanical break (3), horizontal, rough, undulating, up to 3/4" gaps on some fractures			
65 -22.4			>10	62.6' - Fracture or mechanical break, 80 deg, rough, undulating, half of fracture/one side of fracture's rock is missing			
			NR	62.8-63.2' - Fracture zone			
66.0			64.2, 64.35' - Bedding plane or mechanical break (2), horizontal, rough, undulating, up to 1/2" gap			R4: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION						
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS						
70 -27.4	R5-NQ 5 ft 96%	33	2	64.3' - Fractures, 80 deg, rough, undulating	[Symbolic Log]	Limestone 66.0-68.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2) 68.9-70.8' - Same as 66.0'-68.9' 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 voids present due to softness of material, few cavities up to 5/16"x1/8", poorly fossiliferous 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' except moderate olive brown, (5Y 4/4), fine grained, strong HCl reaction, extremely weak (R0) 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 cavities up to 3/16" No Recovery 75.85-76.0' Limestone 76.0-76.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), 15% surface fractures (<1/16"), few cavities up to 2-3/4" 76.6-78.6' - Same as 76.0'-76.6' 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" diameter, trace black organics material up to 2" in diameter 79.8-80.6' - Same as 76.0'-76.6' No Recovery 80.6-81.0' Limestone 81.0-81.8' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), 0-5% surface voids (<1/16") over core surface dependent on softness of rock, many shallow cavities up to 2" diameter 81.8-82.8' - Same as 81.0-81.8' except yellowish brown, (10YR 5/4) 82.8-85.6' - Same as 81.0-81.8' No Recovery 85.6-86.0'	R5: 7 minutes			
			2	66.8' - Fractures (2), 70 deg, smooth, undulating, tight 1/16" gaps						
			2	67.12, 67.4' - Fractures (2), 5 deg, smooth, undulating, 1/2" gap on same surface at 67.4'						
			3	68.15' - Fracture, 5 deg, smooth, stepped, discontinuity fracture between hard and soft rock, large gap						
			5	68.3' - Fracture, 75 deg, rough, undulating, vertical fracture, tight						
	75 -32.4	R6-NQ 5 ft 97%	80	0			68.9' - Mechanical break	[Symbolic Log]		R6: 11 minutes
				NR			69.3, 70.8' - Mechanical break, due to rock softness			
				3			71.55, 71.85' - Fractures (2), horizontal and vertical, smooth, undulating, two horizontal fractures, gaps up to 1/2"			
				0			71.7' - Fracture, vertical, rough, undulating, vertical fracture, gap up to 1/2"			
				0						
80 -37.4	R7-NQ 5 ft 92%	34	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	[Symbolic Log]		R7: 9 minutes			
			0							
			0							
			0	80.15-80.45' - Fracture zone						
			NR							
85 -42.4	R8-NQ 5 ft 92%	8	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 (11)	[Symbolic Log]		R8: 7 minutes			
			0							
			0							
			4	84.35, 84.4, 84.5' - Fractures (3), horizontal, rough, undulating, horizontal fractures, up to 1/4"						
			>10							
86.0	NR									



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 1.6 ft bgs on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
90 -47.4	R9-NQ 5 ft 57%	30	>10 >10 0	84.4' - Fracture, vertical, rough, undulating, bounded by horizontal fractures at 84.35-84.4', half of core, other fracture surface not present 84.95-85.2' - Fracture zone 86.0-87.05' - Fracture zone, rock CaCO3 silt 87.65-87.9' - Fracture zone 88.5' - Mechanical break, to fit in box	Limestone 86.0-86.6' - moderate yellowish brown grading to yellowish gray, (10YR 5/4 to 5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), black carbon, organic material from 86.0-86.15' 86.6-87.9' - Same as 86.0'-86.6' except extremely weak (R0), 40% surface voids (<1/16"), many cavities up to 9/16" diameter, trace black organic material up to 1/16" 87.9-88.85' - Same as 86.0'-86.6' except very weak to weak (R1 to R2), 25-40% surface voids (<1/16"), many cavities up to 9/16", few fossil molds No Recovery 88.85-91.0' Limestone 91.0-95.3' - Same as 87.9'-88.85' except yellowish gray to yellowish brown, (5Y 7/2 to 10YR 5/4)	SC-3 collected at 88.0-89.1'	
91.0		NR				R9: 7 minutes	
95 -52.4	R10-NQ 5 ft 100%	75	3 0 2 1 >10	91.1' - Fracture, 75 deg, rough, undulating, vertical fracture 1/8" 91.8' - Fracture, 60 deg, rough, undulating, vertical fracture 91.9' - Fracture, 40 deg, rough, undulating, diagonal fracture 92.8' - Mechanical break, for hardness test 93.5' - Fracture, 60 deg, diagonal fracture, up to 3/4" gap 93.8' - Fracture, horizontal, rough, undulating, horizontal fracture, fracture surfaces eroded, up to 3/4" gap 94.1' - Mechanical break 94.25' - Fracture, 70 deg, rough, undulating, tight up to 1/4" gap 94.7, 94.85' - Mechanical break 95.3-96.0' - Fracture zone 96.4-96.6' - Fracture zone, 45 deg, rough, undulating, fracture on either side 92.0-97.45' - Fracture zone, horizontal and 50 deg, rough, undulating	94.95-95.25' - Same as 91.0'-95.3' except 5% surface voids (<1/16"), few cavities up to 3/16" 95.3-96.0' - Same as 91.0'-95.3' except fine grained, extremely weak (R0), 5% surface voids (<1/16"), black organic material up to 3/8" 96.0-97.7' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, weak (R2), 25% voids (<1/16") on core surface, many cavities up to 3/8"x9/16", fossil (molds), many fossil casts, recrystallization present No Recovery 97.7-101.0'	R10: 8 minutes	
100 -57.4	R11-NQ 5 ft 34%	17	3 >10 NR			R11: 5 minutes	
105 -62.4	R12-NQ 5 ft 60%	52	2 >10 2 NR	101.15' - Fracture, 70 deg, rough, undulating, vertical fracture, large gap 101.6' - Bedding plane, horizontal, rough, undulating, 1/8" gap 101.95- 102.1' - Fracture zone, rough, undulating, fracture on either side 102.9' - Bedding plane, horizontal, rough, undulating, up to 1/4" gap 103.2' - 5 deg, rough, undulating	Limestone 101.0-102.6' - Same as 96.0'-97.7' 102.6-103.2' - Same as 96.0'-97.7' except extremely weak (R0), 20% surface voids (<1/16"), many cavities up to 5/16" 103.2-104.0' - Same as 96.0'-97.7' No Recovery 104.0-106.0'	SC-4 collected at 103.2-104.0'	
106.0						R12: 8 minutes	



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 : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
110 -67.4	R13-NQ 5 ft 96%	50	3	106.2' - Fracture zone 106.5' - Fractures, horizontal, rough, undulating, up to 1/4" gap 106.75' - Mechanical break 107.1' - Fracture, horizontal, rough, stepped, up to 1/2" gap 107.3' - Fracture, 55 deg, rough, undulating, up to 1/4" gap 107.35' - Fracture, horizontal, rough, undulating 107.9' - Fracture, horizontal, smooth, undulating, large gap with rock crush on part of fracture 108.7' - Fracture, 80 deg, smooth, undulating, half of fracture is rock crush		Limestone 106.0-107.15' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong HCl reaction, very weak (R1), voids (<1/16") over 20-40% of surface, silt infill in void spaces present, many cavities up to 1-3/16"x3/4", many fossil molds 107.15-110.8' - Same as 106.0'-107.15' except weak (R2)	R13: 13 minutes	
115 -72.4	R14-NQ 5 ft 66%	25	2	111.2' - Mechanical break 111.4' - Fracture, 20 deg, rough, stepped, gap up to 1.5" 111.65' - Mechanical break, 50 deg, smooth, undulating, tight 112.35' - Fracture, 80 deg, rough, undulating, black, half of fracture surface/side missing, little black staining 112.35, 112.75' - Fractures, 20 deg, rough, undulating, gaps up to 3/4" thick with rock fragments 112.8' - Fracture, 70 deg, rough, undulating, half of fracture is rock fragments 112.95' - 60 deg, smooth, undulating, up to 1/2" gap 113.7' - Fracture, 30 deg, smooth, undulating, tight 114' - Fracture, 80 deg, rough, undulating, fracture 113.5-114.3', half fracture is rock fragments		No Recovery 110.8-111.0' Limestone 111.0-114.3' - Same as 107.15'-110.8' No Recovery 114.3-116.0'	R14: 7 minutes	
120 -77.4	R15-NQ 5 ft 48%	25	>10	116.0-116.3' - Fracture zone 117.3' - Mechanical break 117.45-117.9' - Fracture zone 118.05' - Fracture, horizontal, smooth, undulating, tight up to 1/8" gap 118.25' - 10 deg, rough, undulating		Limestone 116.0-118.4' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 15% of core surface, many small cavities up to 3/8"x1/16" No Recovery 118.4-121.0'	SC-5 collected at 116.0-117.2' R15: 6 minutes	
125 -82.4	R16-NQ 5 ft 62%	40	1	121.65, 122.6' - Fracture, rough, stepped, half of fracture is not present 121.9' - Fracture, vertical and 5 deg, rough, stepped, fracture pair runs from 121.65-122.6', half of fracture is crushed or not present 122.1, 122.25' - Fracture zone 123.2' - Mechanical break, rough, stepped, up to 1/2" gap 123.5' - Mechanical break, horizontal, rough, stepped, tight up to 1/4" gap 123.75' - Mechanical break, horizontal, rough, up to 3/4" gap		Limestone 121.0-124.1' - Same as 116.0'-118.4' except many cavities up to 3/8" diameter or 9/16"x3/16", few fossil molds with recrystallized surfaces No Recovery 124.1-126.0'	R16: 8 minutes	



PROJECT NUMBER: 338884.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 : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
130 -87.4	R17-NQ 5 ft 27%	0	NR		Limestone 126.0-127.35' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), surface voids (<1/16") up to 15%, many cavities up to 3/16"x3/8", little recrystallization No Recovery 127.35-131.0'	R17: 6 minutes	
135 -92.4	R18-NQ 5 ft 26%	0	NR		Limestone 131.0-134.3' - Same as 126.0'-127.35' except light olive gray, (5Y 5/2), very weak to weak (R1 to R2), voids (<1/16") over 0-5% at surface, few fossil molds, cavities up to 3/8" No Recovery 134.3-136.0'	R18: 9 minutes	
140 -97.4	R19-NQ 5 ft 50%	15	NR		Limestone 136.0-137.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCl reaction, extremely weak (R0), 25% surface voids (<1/16"), many cavities up to 1/4"x3/16", trace fossil casts 137.0-138.5' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, weak (R2), 5% surface voids (<1/16"), many cavities up to 3/8"x9/16", moderately fossiliferous with molds and casts No Recovery 138.5-141.0'	R19: 8 minutes	
145 -102.4	R20-NQ 5 ft 47%	7	NR		Limestone 141.0-141.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), 15% surface voids (<1/16"), many cavities and molds up to 3/16"x3/8" 141.3-143.35' - Same as 141.0'-141.3' except extremely weak to very weak (R0 to R1) No Recovery 143.35-146.0'	R20: 8 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 6/14/07 START : 4/23/2007 END : 4/25/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.4	R21-NQ 5 ft 100%	50	0		Limestone 146.0-148.0' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), 5-15% surface voids (<1/16"), many cavities up to 3/16" 148.0-148.3' - Same as 146.0'-148.0' except 25% surface voids (<1/16"), many cavities up to 3/16"x3/8" 148.3-151.0' - Same as 146.0'-148.0'	R21: 9 minutes	
		1	147.2' - Fracture, 10 deg and 40 deg, rough, undulating, up to 1" gap				
		>10	148.0, 148.12, 148.25, 148.4, 148.5, 148.6' - Fracture, 5 deg, rough, undulating				
		>10	148.75' - Mechanical break, rough, undulating, 1/8"-1/4" gaps				
		>10	148.9' - Fracture, 70 deg, rough, undulating, gray/black				
	151.0		>10	148.75-149.3' - Fracture zone 149.5' - Fracture, horizontal and vertical, rough, undulating, tight to 1/2" gap 149.65-150.5' - Fracture zone	Bottom of Boring at 151.0 ft bgs on 4/25/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-17	SHEET 1 OF 9
SOIL BORING 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
 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 : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.2	0.0	0.3	SS-1	0-1-2 (3) Topsoil 0.0-0.3' - brownish black, (5YR 2/1)	1 1/2	Drilling with 3-7/8" tri-cone bit
	1.5					Driller's Remark: Water encountered at approximately 2.5' below ground surface
5 37.2						Medium to heavy chatter at 5.5-6.0'
	6.5	0.6	SS-2	2-2-1 (3) Clayey Sand (SC) 6.5-7.1' - light olive gray, (5Y 6/1), wet, very loose, very fine to fine silica sand, 40% medium to high plastic fines, trace roots	2 1/2	
	8.0					
10 32.2						Moderate chatter at approximately 10'
	13.0	0.8	SS-3	5-5-3 (8) Limestone Fragments 13.0-13.3' - moderate yellowish brown to grayish orange, (10YR 5/4 to 10YR 7/4), strong HCl reaction	3 1/2	
	14.5			Silt (ML) 13.3-13.8' - grayish yellow, (5Y 8/4), wet, medium stiff, nonplastic, rapid dilatancy, strong HCl reaction, 10% very fine sand-sized, carbonate	4 1/2	
15 27.2						
	19.5					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-17	SHEET 2 OF 9
SOIL BORING 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
 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 : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR 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, nonplastic, very rapid dilatancy, moderate to strong HCl reaction, 10% very fine to medium sand-sized, all carbonate	| | | | |		
21.0							
25 17.2	0.4	SS-5	10-3-2 (5)	Silt With Sand (ML) 26.0-26.4' - yellowish gray, (5Y 7/2), wet, medium stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 20% very fine to medium sand-sized, coarse gravel-sized limestone fragments, all carbonate material	| | | | |		
26.0							
30 12.2	1.3	SS-6	17-18-50/4 (68/10")	Sandy Silt (ML) 32.5-33.75' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 25-30% fine to coarse sand-sized, all carbonate	| | | | |		
32.5							
35 7.2				Begin Rock Coring at 34.5 ft bgs See the next sheet for the rock core log			
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
55 -12.8			0		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) 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 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 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 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' 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 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 HCl reaction, 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	R5: 2 minutes	
			1	55.7' - Fracture, 60 deg, rough, planar, very tight			
	56.5		NR				
			0				
			2	57.8' - Fracture, vertical, rough, planar, 15% coverage black staining, fracture trace from 57.0-58.35'			
	R6-NQ 5 ft 100%	85	1	58.3' - Fracture, 60 deg, rough, undulating, very tight			
			1	59.0' - Fracture, 10 deg, smooth, stepped, tight			
60 -17.8			1	59.9' - Fracture, 15 deg, smooth, undulating, tight			
			1	61.3' - Fracture, 20 deg, rough, undulating, open			
			1	62.1' - Fracture, 10 deg, rough, undulating, open			
			1	63.2' - Fracture, 10 deg, smooth, undulating, tight			
	R7-NQ 5 ft 98%	87	3	63.55, 64.1' - Fractures (2), 20 deg, rough, undulating, tight			
			2	64.45, 65.0' - Fractures (2), 10-25 deg, smooth, undulating, tight			
65 -22.8			2	65.2' - Fracture, 15 deg, rough, undulating, black carbonaceous coating over 30% of surface, open			
			2	65.8' - Fracture, 25 deg, rough, undulating, open			
			NR				
			1	66.2' - Fracture, 85 deg, rough, planar, very tight, incipient "hair line" fracture from 65.85-66.4'			
			1	67.4' - Fracture, horizontal, smooth, planar, very tight			
	R8-NQ 5 ft 100%	100	7	67.9' - Fracture, 5 deg, smooth, undulating, tight			
			1	68.65, 69.9' - Fractures (2), 15-20 deg, rough, undulating, tight			
70 -27.8			2	70.7, 71.2' - Fractures (2), 50 deg, rough, planar, tight			
			0				
			4	72.5-72.6' - solution cavity			
			1	72.75' - Fracture, 15 deg, smooth, undulating, open			
	R9-NQ 5 ft 90%	83	1	72.76-72.8' - limestone fragments			
			1	73.25' - Fracture, 20 deg, rough, undulating, open			



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
 WATER LEVELS : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
75 -32.8			1	73.6, 74.8' - Fractures (2), 5-10 deg, smooth, undulating, open	Limestone 67.4-69.4' - grayish orange, (10YR 7/4), very fine grained, extremely weak to very weak (R0 to R1), trace voids and cavities but increasing below 69.0', thinly laminated with wispy, black, carbonaceous material at top of interval, fossils rare to absent 69.4-71.5' - Same as 65.35-66.4' except coverage of voids/cavities 10-15% 71.5-72.5' - Same as 67.4-71.5' except rounded to irregularly shaped limestone clasts in a dark yellowish brown (10YR 4/2) limestone matrix, very fine grained, 50-60% coverage of voids 1/16" or less 72.5-75.0' - pale yellowish brown with yellowish gray mottling, (10YR 6/2 and 5Y 7/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), trace fossils, some irregularly shaped limestone (clast-like) features with 1-3% coverage of voids 1/16" or less on surface, remainder of limestone essentially void free, occasionally thinly laminated with trace black organic material 75.0-76.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), 1-2% coverage of voids 1/16" or less, occasionally thinly laminated with white, discontinuous limestone, some intraclasts/cavity infilling, core surface irregular/indented No Recovery 76.0-76.5' Limestone 76.5-79.6' - mild HCl reaction, very weak (R1), highly fossiliferous, 50-60% coverage of voids 1/16" or less (highly variable through sample), many cavities up to 3/8", 10-15% coverage of black organics, elongated cavity 1" wide by 1.5" long by 0.5" deep at 78.2-78.35' infilled with dark yellowish brown material in a radiating horizontal pattern, non calcareous, trace charcoal gray material at 79.0-79.5' No Recovery 79.6-81.5' Limestone 81.5-83.4' - yellowish gray mottled, (5Y 7/2 and 5Y 8/1), fine grained, mild HCl reaction, very weak to weak (R1 to R2), 35-40% coverage of voids 1/16" or less on surface, cavities up to 1 3/16" - 1 9/16" by 3/8"-3/4" (especially near base of interval), trace fossils (casts/molds)	R9: 6 minutes	
76.5			0				
			NR				
			>10	76.5-77.9' - Fracture zone, limestone fragments from gravel to cobble sized			Stop drilling for day, 3/29/07 at 10:29 Resume drilling 4/3/07 at 09:54
			>10				
	R10-NQ 5 ft 62%	10	>10	78.2, 78.45, 78.6' - Fractures (3), 20-30 deg, rough, undulating, open			
80 -37.8			NR	79.1-79.6' - Fracture zone, limestone fragments from gravel to cobble size			R10: 3 minutes
			>10	81.5-82.0' - Fracture zone, limestone fragments from gravel to cobble size			
			1	82.2' - Fracture, vertical, rough, planar, tight (incipient)			
			1	82.4, 82.95' - Fractures (2), 15 deg, rough, undulating, tight			
	R11-NQ 5 ft 84%	68	1	83.6' - Fracture, 10 deg, rough, undulating, open			
85 -42.8			0				
			1	85.6' - Fracture, 30 deg, rough, undulating, open		R11: 5 minutes	
			NR				
			2	86.6' - Fracture, vertical, rough, planar, open			
			1	86.7' - Fracture, 25 deg, rough, undulating, open		SC-2 collected at 86.7-87.65'	
			1	87.7' - Fracture, 10 deg, rough, undulating, tight			
	R12-NQ 5 ft 84%	60	1	89.0' - Fracture, 60 deg, rough, undulating, tight			
90 -47.8			>10	89.75-90.7' - Fracture zone, limestone fragments from gravel to cobble size, some black carbonaceous coating on partings		R12: 7 minutes	
			NR				
			>10	91.5-92.7' - Fracture zone, rough, stepped to undulating, various angles, tight to open			
			4				
			6	93.15' - Fracture, 70 deg, rough, undulating, tight			
	R13-NQ 5 ft 90%	6	6	93.3' - Fracture, horizontal, rough, undulating, 1/16" open			



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
 WATER LEVELS : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
95 -52.8			3	93.55' - Fracture, horizontal, rough, undulating, brown clay coating over 20-30%, open		Limestone 83.4-83.7' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, very weak (R1), thinly laminated, black carbonaceous laminae present, some voids (<1%) at top of interval, friable 83.7-85.7' - Same as 81.5-83.4' except circular to subcircular cavities common (3/8" or less in diameter), some cavity infilling No Recovery 85.7-86.5' Limestone 86.5-90.7' - Same as 81.3-83.4' except voids and cavities up to 10% coverage from 87.65-89.0' increasing to 20-30% coverage below 89.0', black carbonaceous coating on bedding plane at 90.5' No Recovery 90.7-91.5' Limestone 91.5-92.0' - Same as 81.5-83.4' 92.0-93.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, medium strong (R3), moderately fossiliferous, trace coverage of voids 1/16" or less on surface, trace cavities 93.0-93.6' - yellowish gray, (5Y 7/2), fine grained, very weak (R1), cavities numerous at contact of overlying interval, 1-2% coverage of voids 1/16" or less on surface Lignite 93.6-94.1' - no HCl reaction, laminar bedding Limestone 94.1-95.2' - medium grained, mild HCl reaction, extremely weak to very weak (R0 to R1) 95.2-96.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, very weak to weak (R1 to R2), thinly laminated with white HCl reactive limestone, fossiliferous (molds/casts), 10-15% coverage of voids on surface, trace cavities (3/8" or less in diameter) No Recovery 96.0-96.5' Limestone 96.5-100.0' - Same as 92.0-93.0' except becoming pale yellowish brown (10YR 6/2) with depth, fossiliferous, with gastropods common (elongated spiral individuals), intermittently interbedded with medium grained limestone with 15-20% coverage of 1/16" or less voids on surface No Recovery 100.0-101.5'	R13: 7 minutes R. McComb logged discontinuities for R13 SC-3 collected at 98.7-99.6' R14: 6 minutes Driller's Remark: Lost circulation at about 101.0' Driller's Remark: Regained circulation at about 104.0' R15: 4 minutes R16: 4 minutes SC-4 collected at 112.7-113.8'	
			1	93.8' - Fracture, horizontal, smooth, planar, tight, (clay contact)				
	96.5		NR	93.97' - Fracture, horizontal, smooth, planar, horizontal, tight				
			>10	94.25, 94.37' - Fractures (2), horizontal, rough, undulating, 1 3/16"-1 9/16" open				
			4	94.50-94.60' - Fracture zone, rough, multiple orientation				
			10	94.9' - Fracture, horizontal, rough, undulating, up to 1/16" open				
		42	5	95.25' - Fracture, 0-70 deg, rough, undulating, open				
			NR	95.5' - Fracture zone, 80 deg, rough, planar to undulating, several en echelon fracture planes				
			10	96.0' - Fracture, 50 deg, rough, undulating				
			>10	96.5-97.0' - Fracture zone, low to high angle, rough, stepped to undulating, tight to open				
			0	97.4-97.7' - Fracture zone, high angle, criss cross fractures intersecting at 45 degrees, rough, planar, tight				
			>10	97.85' - Fracture, 40 deg, rough, stepped, tight				
		20	NR	98.0' - Fracture, 15 deg, rough, undulating, open				
			1	98.1' - Fracture, 45 deg, rough, planar, tight				
			NR	98.7' - Fracture, 20 deg, rough, undulating, open				
			>10	99.6-100.1' - Fracture zone, various angles, rough, stepped to undulating, tight to open				
			>10	101.6' - Fracture, 10 deg, smooth, undulating, open, possible mechanical break				
			>10	101.7' - Fracture, 15 deg, smooth, undulating, open				
			>10	102.3-103.2' - Fracture zone, predominately horizontal to <5 deg, stepped to undulating, open, coarse gravel size rock fragments				
			1	106.5-107.2' - Fracture zone, predominately horizontal to <5 deg, stepped to undulating, open, coarse gravel size rock fragments				
		40	1	107.2, 107.35' - Fractures (2), <5 deg, rough, stepped, open				
			>10	107.43, 107.57' - Fractures (2), <5 deg, rough, undulating, open				
			>10	109.4' - Fracture, 30 deg, rough, undulating, tight				
			>10	109.8-110.9' - Fracture zone, fragments up to gravel size, angular to subangular				
			NR	111.5-111.85' - Fracture zone, limestone fragments from gravel to cobble size				
			>10	112.0' - Fracture, 50 deg, rough, planar, tight				
			1	112.7-113.8' - Fractures (2), 30 deg, rough, undulating, tight				
		78	1					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
115 -72.8	R18-NQ 5 ft 96%	85	2	114.75' - Fracture, 65 deg, rough, planar, tight	Limestone 101.5-103.8' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), 10-15% coverage of voids 1/16" or less on surface, cavities 3/8"-3/4" in length (elongated), fossiliferous (casts/molds) No Recovery 103.8-106.5' Limestone 106.5-111.0' - Same as 101.5-103.8' except very weak (R1), 20-25% coverage of small cavities, fewer fossils, very friable No Recovery 111.0-111.5' Limestone 111.5-116.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak (R2), no apparent bedding, 15-25% coverage of voids 1/16" or less, many cavities up to 3/8", trace very fine grained lenses, less fossiliferous 116.5-121.3' - Same as 111.5-116.5' except mild to moderate HCl reaction, except many cavities 1"-2", fossiliferous (molds and casts), intervals of very weak (R1) limestone with few voids/cavities with up to 1/8" thick wavy laminations No Recovery 121.3-121.5' Limestone 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 1/4", fossiliferous (molds/casts of echinoids/gastropods), intervals of dusky yellow green (5GY 5/2), very fine grained limestone with strong HCl reaction at 121.7-122.3', 124.6-125.1' and 126.0-126.05' No Recovery 126.05-126.5' Limestone 126.5-131.25' - Same as 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' No Recovery 131.25-131.5' Limestone 131.5-133.2' - Same as 126.5-131.25'	R17: 4 minutes	
116.5			3	115.4' - Fracture, 25 deg, rough, undulating, open			
			0	115.6' - Fracture, 30 deg, rough, stepped, (bidirectional), open			
			2	116.0' - Fracture, 30 deg, rough, undulating, open			
			3	116.25' - Fracture, vertical, smooth, planar, tight, secondary fracture at 90 degrees to above fracture			
			2	117.5' - Fracture, 20 deg, rough, undulating, tight			
			3	117.9' - Mechanical break			
			2	118.75' - Fracture, 10 deg, rough, undulating, tight, organic infilling (lignite)			
120 -77.8				2		119.1, 119.35' - Fractures (2), 10 deg and 15 deg, rough, undulating, tight	
				2		120.1' - Fracture, 10 deg, smooth, undulating, open	
	R19-NQ 5 ft 91%	67	NR	120.5' - Fracture, 20 deg, rough, undulating, tight			
			>10	121.0' - Fracture, 30 deg, rough, undulating, open			
			0	121.2' - Fracture, 10 deg, smooth, undulating, open			
			2	121.5-121.7' - Fracture zone, horizontal, rough, planar to undulating, open			
			10	121.9' - Fracture, 40 deg, rough, planar, open			
			2	124.3' - Fracture, vertical, smooth, planar, tight			
125 -82.8				2	124.35-124.65' - Fracture zone, inclined to near vertical, rough, stepped to undulating, tight, several fracture planes		
			NR	124.65-124.72' - Fracture zone, rough, planar, gravel size limestone fragments bounded by horizontal open bedding planes			
			1	124.92' - Fracture, <5 deg, smooth, undulating, open			
			1	125.85' - Fracture, 60 deg, rough, undulating, extends from 125.7-126.05', tight, secondary fracture off main fracture also at high angles			
	R20-NQ 5 ft 95%	68	3	127.0' - Fracture, 75 deg, rough, undulating, tight, extends from 126.5-127.3'			
			4	128.1' - Fracture, 60 deg, smooth, planar, tight			
			2	128.8' - Fracture, 15 deg, rough, undulating, open			
			NR	129.0' - Fracture, 85 deg, rough, planar, silty sand infilling			
			0	129.2' - Fracture, <5 deg, rough, undulating, open			
			>10	129.9' - Fracture, 10 deg, rough, undulating, open			
			2	130.0, 130.2, 130.3' - Fractures (3), 20 deg, smooth, undulating, tight			
				130.6' - Fracture, 35 deg, rough, undulating, tight			
				130.85' - Fracture, 30 deg, rough, undulating, open			
			R21-NQ 5 ft 90%	48			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)

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 bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
135 -92.8	136.5	25	>10	132.8-133.2' - Fracture zone, 0-90 deg, rough to smooth, planar to undulating/stepped	Limestone	R21: 4 minutes	
			0	133.45, 133.75, 134.3' - Fractures (3), 15-20 deg, smooth, planar, tight			
	R22-NQ 5 ft 62%	25	NR	134.3-135.2' - Fracture zone, 0-90 deg, rough to smooth, planar to undulating/stepped, multiple high angle fracture planes	133.2-135.25' - yellowish gray, (5Y 7/2), fine to very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 1-2% coverage of voids 1/16" or less on surface, fossil molds/casts trace to absent	R22: 12 minutes	
			2	136.6' - Fracture, <5-90 deg, rough, stepped, open			135.25-136.0' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, very weak (R1), 3-5% coverage of voids 1/16" or less on surface, cavities (up to 3/8") common
			4	137.3' - Fracture, 20 deg, smooth, planar, very tight			No Recovery 136.0-136.5' Limestone
140 -97.8			NR	137.85' - Fracture, 30 deg, rough, undulating, open			136.5-138.35' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak (R2), 10-15% coverage of voids 1/16" or less distributed unevenly across core surface, cavities common (3/8" or less), poorly fossiliferous (molds/casts)
	R23-NQ 5 ft 82%	45	>10	138.0' - Fracture, 70 deg, rough, undulating, tight	138.35-138.8' - Same as 135.25-136.0'	SC-5 collected at 142.0-142.85	
			10	138.37' - Fracture, <5 deg, rough, stepped, tight			138.8-139.0' - Fracture zone, 0-90 deg, smooth, stepped
			10	138.5' - Fracture, 0-60 deg, rough, stepped, tight			139.3-139.6' - Fracture zone, 0-90 deg, smooth, stepped
			2	138.8-139.0' - Fracture zone, 0-90 deg, smooth, stepped			141.5-142' - Fracture zone, 0-90 deg, rough, stepped to undulating, open
145 -102.8			NR	139.3' - Fracture, 0-70 deg, rough, stepped, open			142.85' - Fracture, 20 deg, rough, undulating, tight
			NR	139.3-139.6' - Fracture zone, 0-90 deg, smooth, stepped			143.1, 143.25, 143.4' - Fractures (3), 60 deg, smooth, planar, very tight
	R24-NQ 5 ft 100%	87	0	143.5' - Fracture, 60 deg, rough, stepped, bidirectional, open	139.0-139.6' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, very weak to weak (R1 to R2), 3-5% coverage of voids 1/16" or less on surface, cavities common up to 3/8"-3/4"	R23: 12 minutes	
			3	143.6' - Fracture, 60 deg, rough, stepped, (bidirectional-partial removal of rock core interval), open			No Recovery 139.6-141.5' Limestone
			3	143.75' - Fracture, 20 deg, smooth, undulating, tight			141.5-143.7' - grayish yellow to pale yellowish brown, (10YR 7/4 to 10YR 6/2), very fine grained, mild to moderate HCl reaction, strong to very strong (R4 to R5) from
			2	143.95' - Fracture, 40 deg, smooth, planar, open			142.75-143.0', becoming less strong below 143.0', 1-2% coverage of voids 1/16" or less, trace cavities (<3/16"), fossils trace to absent
150 -107.8			NR	144.0-144.3' - Fracture zone, 0-50 deg, rough to smooth, planar to stepped			143.7-144.0' - variegated moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), thinly laminated, possible intraclasts 1/16" in diameter (light gray), cavities/voids trace to absent, fossils trace to absent, possible carbonaceous/organic material on thin laminae
			2	144.85' - Fracture, <5 deg, rough, undulating, open			
			2	145.3' - Fracture, 30 deg, rough, undulating, open			
			2	147.65' - Fracture, 60 deg, rough, planar, open			
	151.5		0	147.9' - Fracture, 50 deg, rough, undulating, open		R24: 8 minutes Drilling ended 16:04 on 4/3/07 at 151.5'	
			3	148.0' - Fracture, horizontal, rough, planar, tight			
			2	148.5, 148.55, 149.45' - Fractures (3), 5-10 deg, rough, undulating, tight			
			2	149.8' - Fracture, 30 deg, smooth, undulating, tight			
				150.0, 150.6' - Fractures (2), 15 deg and 30 deg, rough, undulating, open			
				151.05' - Fracture, 20 deg, smooth, undulating, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.5 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					144.0-144.25' - Same as 141.5-143.7' except very weak to weak (R1 to R2) 144.25-145.6' - Same as 135.25-136.0' No Recovery 145.6-146.5' Limestone 146.5-151.5' - yellowish gray, (5Y 7/2), mild HCl reaction, weak to medium strong (R2 to R3), 3-5% coverage of voids 1/16" or less on surface, some cavities up to 1/8", poorly fossiliferous (molds/casts) Bottom of Boring at 151.5 ft bgs on 4/3/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-18	SHEET 1 OF 8
SOIL BORING 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
 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 bgs on 4/22/07 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
42.0	0.0	1.0	SS-1	1-1-1 (2)	Poorly Graded Sand With Organics (SP) 0.0-1.0' - olive gray, (5Y 3/2), moist, very loose, very fine to fine silica sand, trace nonplastic fines, 20% organics decreasing with depth		14:49 Begin drilling, SPT sample, sand is silica
	1.5						
5 37.0	5.0	1.2	SS-2	1-2-1 (3)	Clayey Sand (SC) 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, medium plasticity, no dilatancy, 66% fine silica sand		
	6.5						
10 32.0	10.0	0.8	SS-3	7-4-3 (7)	Limestone Fragments 10.0-10.4' - dusky yellow, (5Y 6/4), moderate HCl reaction 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		
	11.5						
15 27.0	15.0	1.3	SS-4	26-29-36 (65)	Silt With Sand And Limestone Fragments (ML) 15.0-16.3' - Same as 10.5-11.5' except 20% fine to coarse sand-sized, 10-15% coarse sand-sized to fine gravel-sized limestone fragments at top of sample		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-18	SHEET 2 OF 8
SOIL BORING 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
 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 bgs on 4/22/07 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.0	20.0	1.2	SS-5	31-14-12 (26)	Sandy Silt (ML) 20.0-21.2' - Same as 15.5-16.5' except grayish orange, (10Y 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 35-40% fine to coarse sand		
	21.5						
25	25.0	1.0	SS-6	2-3-2 (5)	Sandy Silt With Limestone Fragments (ML) 25.0-26.0' - Same as 20.5-21.5' except firm and 20-25% fine gravel-sized limestone fragments		
17.0	26.5						
30	30.0	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 moderate HCl reaction, 10% fine gravel-sized Begin Rock Coring at 31.0 ft bgs See the next sheet for the rock core log		16:15 Adding 15 more feet of casing to 30.0' below ground surface
12.0	30.5						
35							
7.0							
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
31.0	R1-NQ 5 ft 100%	80	1	31.9' - Bedding plane, 10 deg, rough, undulating, open 1/8" 32.25' - Bedding plane, <5 deg, smooth, planar, tight 32.5' - Mechanical break, 5 deg, rough, undulating, highly fossiliferous 32.6' - Bedding plane, 10 deg, smooth, planar, highly fossiliferous, tight 32.9' - Mechanical break, 15 deg, rough, undulating, highly fossiliferous, tight 33.1' - Bedding plane, 10 deg, smooth, planar, highly fossiliferous, tight 33.5, 33.8' - Bedding plane (2), 30 deg, smooth, planar, tight 33.75, 35.5' - Fractures (2), rough, undulating, tight, high angle fractures	Limestone 31.0-36.0' - moderate yellow to light olive gray, (5Y 7/6 to 5Y 5/2), with mottling of the two colors from 32.8-35.4', very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous, fossil casts and molds, voids over 50-70% of surface up to 1/16", dissolution cavities up to 1/2"x2" on 10% of surface 36.0-40.7' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), fine grained, moderate to strong HCl reaction, extremely weak (R0), fine grained silts, fossiliferous, voids up to 1/16" on 20% of surface, dissolution zones up to 10% of surface up to 1/2"x1" from 36.0-37.1' dusky yellow to pale olive (5Y 6/4 to 10Y 6/2), organic layers throughout 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 olive gray to dusky yellow (5Y 5/2 to 5Y 6/4), highly fossiliferous, cavities over 30% of surface, up to 1/16", medium gray infill (N5) over 20% of surface, organics throughout, weak (R2) rock, moderate HCl reaction No Recovery 45.9-46.0' Limestone 46.0-51.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), voids up to 1/16" on 10-20% of surface, trace organics on surface	16:57 Begin rock coring at 31.0' below ground surface SC-broke during movement R1: 10 minutes 17:07 Begin coring 36.0-41.0' R2: 10 minutes 17:17 Begin coring 41.0-46.0' SC-1 collected at 42.5-43.3' R3: Run time not recorded 17:27 Drilled 46.0-51.0' R4: Run time not recorded 4/20/07 08:21 Retrieved R4 08:27 Water level at 2.7' below ground surface	
35 7.0			4				
36.0			4				
40 2.0			0				
41.0			1				
45 -3.0	R2-NQ 5 ft 94%	0	0	43.4' - Bedding plane or mechanical break, silt and/or clay sized infilling, silt infill, open 1"		R1: 10 minutes R2: 10 minutes R3: Run time not recorded	
46.0			0				
50 -8.0			0				
51.0			0				
			NR				
51.0	R3-NQ 5 ft 98%	0	0	46.7' - Bedding plane, 10 deg, rough, undulating, tight 47.1, 47.2, 47.6' - Bedding plane (3), 10 deg, rough to smooth, undulating, tight 48.55, 48.9, 49.6' - Bedding plane (3), 10 deg, rough, undulating, tight 47.4, 48.15, 48.5, 49.4, 50.0' - Mechanical break (4) 49.45' - Bedding plane, 30 deg, rough, undulating, tight 50.0' - Mechanical break		R2: 10 minutes R3: Run time not recorded R4: Run time not recorded 4/20/07 08:21 Retrieved R4 08:27 Water level at 2.7' below ground surface	
			0				
			1				
			0				
			NR				
	R4-NQ 5 ft 100%	40	1	46.7' - Bedding plane, 10 deg, rough, undulating, tight 47.1, 47.2, 47.6' - Bedding plane (3), 10 deg, rough to smooth, undulating, tight 48.55, 48.9, 49.6' - Bedding plane (3), 10 deg, rough, undulating, tight 47.4, 48.15, 48.5, 49.4, 50.0' - Mechanical break (4) 49.45' - Bedding plane, 30 deg, rough, undulating, tight 50.0' - Mechanical break		R3: Run time not recorded R4: Run time not recorded 4/20/07 08:21 Retrieved R4 08:27 Water level at 2.7' below ground surface	
			3				
			2				
			2				
			0				



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
 WATER LEVELS : 2.4 ft bgs on 4/22/07 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
55 -13.0	R5-NQ 5 ft 92%	28	2	50.2' - Bedding plane, 10 deg, rough, undulating, open 1/4" 50.48' - Mechanical break 50.5' - Fracture, 75 deg, smooth, undulating, tight 51.4' - Mechanical break 51.7' - Fracture, <5 deg, rough, undulating, bedding plane fractures, open 1/4" 51.8, 52.6' - Fracture (2), 50-60 deg, rough, undulating, open 1/8" 53.8, 54.4, 51.4' - Mechanical break (3)	Limestone 51.0-51.2, 51.7-52.8, 53.3-54.0, 54.9-55.15' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, weak (R2), fossiliferous, voids 1/16" over 10-20% of surface, trace organics 51.2-51.7, 52.8-53.3, 54.0-54.9, 55.15-55.6' - dusky yellow to pale 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 surface No Recovery 55.6-56.0' Limestone 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' - 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 surface, poorly fossiliferous, organic laminae throughout 59.03-59.65' - Same as 51.0-51.2' No Recovery 59.7-61.0'	4/20/07 08:36 Driller's Remark: Core barrel locked 4/21/07 07:55 Core barrel unlocked-pulled out 08:14 Begin setting 6" casing 10:34 Water level 2.1' below ground surface 10:48 Cleared the hole 11:24 Begin coring 51.0-56.0' R5: 11 minutes 13:12 Begin coring 56.0-61.0' 13:24 Core catcher is not retrieved, washing loose material and going back in with wireline R6: Run time not recorded 13:30 Begin coring 61.0-66.0' SC-2 collected at 62.65-63.5' R7: Run time not recorded 13:45 Begin coring 66.0-71.0' R8: 14 minutes	
56.0			NR				
60 -18.0	R6-NQ 5 ft 73%	27	1	56.9' - Fracture, 80 deg, tight, not completely broken through			
61.0			0	58.3, 58.45, 56.5' - Mechanical break (3)			
65 -23.0	R7-NQ 5 ft 90%	46	0	61.5' - Bedding plane, <5 deg, smooth, undulating, silt infill, open 5" 62.1, 64.9' - Fracture, 65 deg, rough, undulating, open 1/4" 62.25' - Fracture, 10 deg, rough, undulating, associated bedding plane fractures, open 1/4" 62.9' - Fracture, 65 deg, rough, undulating, open 1/4" 64.2, 62.65, 63.5' - Mechanical break (3)			
66.0			NR	65.1, 65.25' - Bedding plane (2), <10 deg, rough, undulating, open 1/4"			
70 -28.0	R8-NQ 5 ft 100%	37	0	67.15, 69.55' - Mechanical break (2)			
71.0			0				
			0				
			1				



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

WATER LEVELS : 2.4 ft bgs on 4/22/07 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
75 -33.0	R9-NQ 5 ft 84%	60	2	70.1' - Bedding plane, <5 deg, silt and/or clay sized infilling, open 1/2", dusky yellow (5Y 6/4) silt infill		69.2-71.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, weak (R2), laminated bedding, voids to 1/16" over 20% of surface, trace laminar bedding Limestone 71.0-73.0' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), strong HCl reaction, weak (R2), voids to 1/16" over <10% of surface, fossiliferous (casts), dissolution along fractures, 5% cover infill of medium gray (N5) 73.0-73.7' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 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 olive, (5Y 6/4 to 10Y 6/2), moderate HCl reaction, weak (R2), voids up to 1/16" over 30% of surface, clay infill in some fractures No Recovery 75.2-76.0' Limestone 76.0-77.8, 78.5-79.5, 79.9-80.8' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, extremely weak (R0), fossiliferous (casts), voids over 20-30% of surface to 1/16", mottled with light olive gray to 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 30% of surface 79.6-79.7' - moderate HCl reaction, clay infill No Recovery 80.8-81.0' Limestone 81.0-85.5' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/8), very fine to fine grained, mild to moderate HCl reaction, weak (R2), voids up to 1/16" on 35-40% of surface, fossiliferous (casts, molds), dissolution cavities 83.9-84.4'. Largest dissolution zone is up to 1/2"x1", very weak (R1) to weak (R2) rock, low to moderate HCl reaction No Recovery 85.5-86.0' Limestone 86.0-87.7' - Same as 81.0-85.5' No Recovery 87.7-91.0'	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"				
			2	73.0' - Bedding plane, 5 deg, rough, undulating, open 1/4", tight				
			1	73.5, 74.9, 75.0' - Mechanical break (3) 73.7, 74.0' - Bedding plane (2), 5 deg, rough, undulating, open 1/4", olive gray (5Y 3/2) clay infilling				
			0					
			NR					
76.0			0					R9: 5 minutes
			1					
80 -38.0	R10-NQ 5 ft 96%	64	1	77.8, 78.9' - Bedding plane (2), 20 deg, rough, undulating, silt zone open 1/4"				14:51 Begin coring 76.0-81.0' SC-3 collected at 76-76.9'
			1	79.6, 76.9, 80.0' - Mechanical break (3)				
			1	80.2' - Fracture, 20 deg, rough, undulating, silt and/or clay sized infilling, silt zone open 1/2"				R10: Run time not recorded
			NR					
81.0			1	81.3' - Bedding plane, <5 deg, rough, undulating, open 1/4"			14:58 Begin coring 81.0-83.0'	
			0	82.25, 83.0, 83.5' - Mechanical break (3)				
			0					
85 -43.0	R11-NQ 5 ft 90%	83	1	84.0' - Bedding plane, <5 deg, rough, undulating, open 1/4", associated with fossils and dissolution zones			R11: 12 minutes	
			1	85.0' - Bedding plane, <15 deg, rough, undulating, open 1/4"				
			NR					
86.0			>10	86.45-86.75' - Fracture zone, rough, undulating, intersecting fractures, open			15:30 Begin coring 86.0-91.0'	
			3	87.1, 87.4' - Bedding plane, <5 deg, rough, undulating, open less than 1/4"			Driller's Remark: Slight circulation loss at 87.0'	
			9	87.3' - Fracture, 75 deg, rough, undulating, tight				
			NR					
90 -48.0	R12-NQ 5 ft 34%	9					R12: Run time not recorded	
91.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-18	SHEET 6 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 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
95 -53.0	R13-NQ 5 ft 80%	50	1		Limestone 91.0-95.0' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak (R2), moderately fossiliferous (casts), voids up to 1/8" over 30% of surface No Recovery 95.0-96.0'	16:44 Begin coring 91.0-96.0' 16:59 Core drilled to 93.5', drillers remark that core barrel is stuck 17:11 Retrieve core sample 91.0-93.5' 17:20 Set 4" casing 4/22/07 09:38 Water level 2.4' below ground surface 09:52 Begin to set 3" casing 11:18 Core barrel freed (3" casing to 85.0') 13:40 NW casing pulled, setting HW casing to 90.0' 15:28 4" casing set 15:49 Begin coring 93.5-96.0' R13: 23 minutes 4/23/07 08:00 Begin coring 96.0-101.0'	
			0	92.3' - Bedding plane, <10 deg, rough, undulating, open 1/4"			
			>10	93.0-93.9' - Fracture zone or mechanical break, smooth to rough, undulating, open up to 1/4", intersecting fractures			
			>10	93.5-94.4' - Fracture zone or mechanical break, smooth to rough, undulating, open 1/4"			
			NR	94.55' - Bedding plane, 15 deg, rough, undulating, open 1/4"			
96.0					Limestone 96.0-96.7' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), very fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to 1/8" over 35-40% of surface 96.7-97.15' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, extremely weak (R0), fossiliferous (casts), voids to 1/16" over 20% of surface, mottled with light olive gray to yellowish gray (5Y 5/2 to 5Y 7/2) 97.15-98.9' - dusky yellow matrix with yellowish gray infill, (5Y 6/4 with 5Y 8/1), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16" over 30% of surface, dissolution cavities up to 1/4"x1/2", infill over 10-50% of surface (same hardness matrix) No Recovery 98.9-101.0' Limestone 101.0-102.7' - dusky yellow with light olive gray infill, (5Y 6/4 with 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16" over 30% of matrix and over 15% of infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine grained 102.7-105.9' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts), voids to 1/16" over 30% of surface, dissolution cavities to 1/4"x1/2", infill over 15-20% of surface, fine grained No Recovery 105.9-106.0'	R14: Run time not recorded 08:09 Begin coring 101.0-106.0' R15: Run time not recorded 08:30 Begin coring 106.0-111.0' SC-4 collected at 106.0-107.0' R16: Run time not recorded	
			<10	96.0-96.2, 96.7-97.0' - Fracture zone (2), rough, undulating, open 1/4", intersecting fractures			
			1	97.6, 98.6' - Bedding plane (2), 10 deg, rough, undulating, tight			
			4	97.7, 98.5' - Mechanical break (2) 98.2' - Bedding plane, 10 deg, rough, undulating, tight			
			NR	98.25, 98.75' - Fracture (2), 50 deg, rough, undulating, with organics in vertical orientation			
100 -58.0	R14-NQ 5 ft 58%	17			Limestone 101.0-102.7' - dusky yellow with light olive gray infill, (5Y 6/4 with 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16" over 30% of matrix and over 15% of infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine grained 102.7-105.9' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts), voids to 1/16" over 30% of surface, dissolution cavities to 1/4"x1/2", infill over 15-20% of surface, fine grained No Recovery 105.9-106.0'	R14: Run time not recorded 08:09 Begin coring 101.0-106.0' R15: Run time not recorded 08:30 Begin coring 106.0-111.0' SC-4 collected at 106.0-107.0' R16: Run time not recorded	
			1	101.7, 104.9' - Mechanical break (2)			
			0	101.9' - Bedding plane, 10 deg, rough, undulating, open 1/2"			
			1	105.3, 102.4, 103.5, 104.2' - Mechanical break (4)			
			1	102.75' - Mechanical break			
			0	103.8' - Bedding plane, 10 deg, rough, undulating, tight			
			0	104.55' - Bedding plane, <5 deg, smooth, undulating			
			0	105.05' - Bedding plane, <5 deg, smooth, undulating, very soft material, open 1/4"			
			NR	105.2-105.8' - Fracture zone, smooth to rough, undulating, intersecting fractures, most are high angle, open 1/8"			
			0				
105 -63.0	R15-NQ 5 ft 98%	97			Limestone 101.0-102.7' - dusky yellow with light olive gray infill, (5Y 6/4 with 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16" over 30% of matrix and over 15% of infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine grained 102.7-105.9' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts), voids to 1/16" over 30% of surface, dissolution cavities to 1/4"x1/2", infill over 15-20% of surface, fine grained No Recovery 105.9-106.0'	R15: Run time not recorded 08:30 Begin coring 106.0-111.0' SC-4 collected at 106.0-107.0' R16: Run time not recorded	
			1	101.7, 104.9' - Mechanical break (2)			
			0	101.9' - Bedding plane, 10 deg, rough, undulating, open 1/2"			
			1	105.3, 102.4, 103.5, 104.2' - Mechanical break (4)			
			1	102.75' - Mechanical break			
			0	103.8' - Bedding plane, 10 deg, rough, undulating, tight			
110 -68.0	R16-NQ 5 ft 100%	90			Limestone 101.0-102.7' - dusky yellow with light olive gray infill, (5Y 6/4 with 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16" over 30% of matrix and over 15% of infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine grained 102.7-105.9' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), highly fossiliferous (casts), voids to 1/16" over 30% of surface, dissolution cavities to 1/4"x1/2", infill over 15-20% of surface, fine grained No Recovery 105.9-106.0'	R15: Run time not recorded 08:30 Begin coring 106.0-111.0' SC-4 collected at 106.0-107.0' R16: Run time not recorded	
			1	101.7, 104.9' - Mechanical break (2)			
			0	101.9' - Bedding plane, 10 deg, rough, undulating, open 1/2"			
			1	105.3, 102.4, 103.5, 104.2' - Mechanical break (4)			
			1	102.75' - Mechanical break			
			0	103.8' - Bedding plane, 10 deg, rough, undulating, tight			
			0	104.55' - Bedding plane, <5 deg, smooth, undulating			
			0	105.05' - Bedding plane, <5 deg, smooth, undulating, very soft material, open 1/4"			
			NR	105.2-105.8' - Fracture zone, smooth to rough, undulating, intersecting fractures, most are high angle, open 1/8"			
			0				
			0				
			0				
			2				
111.0							



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)

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 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION	
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	
115 -73.0	R17-NQ 5 ft 96%	80	0	110.4, 110.7' - Fracture (2), 50-60 deg, rough, undulating, tight	Limestone 106.0-111.0' - dusky yellow, (5Y 6/4), fine grained, strong HCl 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 surface, voids to 1/16" over <20% of surface No Recovery 115.8-116.0' Limestone 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 with light olive gray, (5Y 5/6 with 5Y 5/2), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), laminar features throughout and yellowish gray (5Y 7/2) infill over 15% of surface. Matrix 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 olive gray laminations, (10YR 6/2 with 5Y 5/2), very fine grained, mild HCl reaction, weak (R2), poorly fossiliferous, no voids Limestone 126.4-129.6' - light olive brown, (5Y 5/6), same as limestone in 116.0-120.7' except voids over 25% 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 HCl reaction No Recovery 129.6-131.0'	08:40 Begin coring 111.0-116.0'		
			0					
			0					
			1					
			>10					
	116.0		NR				R17: Run time not recorded	
	120 -78.0	R18-NQ 5 ft 94%	70	6		116.0-116.2' - Fracture zone, smooth to rough, undulating		08:50 Begin drilling 116.0-121.0'
				0		116.3' - Fracture, 55 deg, rough, undulating, tight		
				0		116.4' - Fracture, 80-85 deg, rough, undulating, tight		
				0		116.6' - Bedding plane, 10 deg, rough, undulating		
1				118.8, 120.15' - Mechanical break (2)				
0				119.9' - Fracture, 80 deg, smooth, undulating, open, end missing				
121.0		NR			R18: Run time not recorded			
125 -83.0	R19-NQ 5 ft 100%	62	1	121.4' - Fracture, 80 deg, rough, undulating, open less than 1/8"		09:09 Begin drilling 121.0-126.0'		
			0					
			0	123.5, 125.8, 124.8' - Mechanical break (3)				
			1	124.5' - Bedding plane, smooth, undulating, dissolution features along outer edges of fracture open 1/4"				
			3	125.25' - Fracture, 85 deg, not open				
			>10	125.85, 125.9' - Bedding plane (2), <5 deg, smooth, planar, tight				
130 -88.0	R20-NQ 5 ft 72%	40	>10	126.0-126.4' - Fracture zone, intersecting fractures, open 1/8", tight		09:19 Begin drilling 136.0-131.0'		
			>10	126.75, 127.3, 128.5, 128.7' - Mechanical break (4)				
			0	127.4-127.55' - Fracture zone, intersecting fractures, open 1/4", softer material				
			0	127.8, 127.95' - Fracture (2), 60 deg, rough to smooth, undulating, open 1/4"				
			2	129.35' - Fracture, 60 deg, rough to smooth, undulating, open 1/4"				
			NR	129.5' - Fracture, 60 deg, smooth, undulating				
131.0					R20: Run time not recorded			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-18	SHEET 8 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 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
135 -93.0	R21-NQ 5 ft 64%	10	>10 4 3 1 NR	131.15, 132.1, 132.8' - Bedding plane (3), <5 deg, smooth, planar, open <1/8" 131.4, 133.2, 134.0' - Mechanical break 131.7-132.0' - Fracture zone, smooth to rough, undulating, intersecting fractures, open 1/4" 132.6' - Bedding plane, <5 deg, smooth, planar, open 1/4" 133.45, 133.6' - Fracture zone (2), 60-70 deg, rough, undulating, open 1/4" on 133.45' 133.6' - Fracture, 60-70 deg, rough, undulating, open 1/4" 133.8' - Bedding plane, <5 deg, rough, undulating, tight 133.9' - Fracture, <5 deg, rough, undulating, tight		Limestone 131.0-132.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 20-25% of rock, fossil casts to 3/8"x3/4" over 5% of rock as casts (voids) 132.2-134.2' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/16" over <10% of surface No Recovery 134.2-136.0'	09:34 Begin drilling 131.0-136.0' R21: Run time not recorded	
140 -98.0	R22-NQ 5 ft 74%	53	3 1 1 0 NR	134.0' - Fractures, <5 deg, smooth, planar, open 1/4" 135.7' - Bedding plane, <30 deg, smooth, undulating, open 1/4" 136.0-136.3' - Bedding plane, <5 deg, smooth, planar, tight 136.5, 136.6' - Bedding plane (2), 10 deg, rough, undulating, open 1/4" 137.5' - Fracture, 50 deg, smooth, undulating, tight 138.4' - Mechanical break 138.5, 137.9' - Mechanical break (2) 138.7' - Bedding plane, <30 deg, smooth, undulating, open 1/4"		Limestone 136.0-139.7' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, weak (R2), voids to 1/8" over 30-40% of surface, fossil casts (voids) to 5/16" diameter over 5% of surface No Recovery 139.7-141.0'	09:50 Begin drilling 136.0-141.0' R22: Run time not recorded	
145 -103.0	R23-NQ 5 ft 84%	55	>10 >10 >10 1 1 NR	141.2-141.35' - Fracture zone, pieces to 2"x1", open 1/4" 142.3-142.49' - Fracture zone, pieces to 1"x1/2", open 1/4" 142.9-143.05' - Fracture zone, pieces to 1-1/2"x1/2", open 1/4" 143.2' - Bedding plane or mechanical break, 20 deg, rough, undulating, organic dark stain, open 1", associated with cavities 143.7-143.95' - Fracture zone, pieces to 1"x1/2", open 1/4" 144.55' - Bedding plane, 50 deg, smooth, undulating, tight 145.0' - Fracture, <5 deg, smooth, undulating, open 1/2"		Limestone 141.0-143.7' - light olive gray mottled with yellowish gray, (5Y 6/1 mottled with 5Y 7/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up 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 143.7-145.2' - olive gray, fine grained, moderate HCl reaction, medium strong (R3), trace voids to 1/8", trace fossils to 3/16"x1/16", dark 1/16" laminations (wavy) over 5-10% of surface No Recovery 145.2-146.0'	10:06 Begin drilling 141.0-146.0' SC-6 collected at 141.4-142.3' R23: 34 minutes	
150 -108.0	R24-NQ 5 ft 56%	33	1 2 2 NR	146.95' - Fracture, 20 deg, smooth, undulating, tight 147.65' - Bedding plane, 0-5 deg, smooth, planar, tight 147.9' - Bedding plane, smooth, undulating, open 1/4" 148.3, 148.35' - Fractures (2), 50 deg, smooth, undulating, tight, open 1/2"		Limestone 146.0-147.9' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 0-40% of surface in interbedded nature interchanging every 3-1/8", trace fossil casts to 1/8"x9/16"	10:40 Begin drilling 146.0-151.0' 10:51 Finish drilling R24: Run time not recorded Used 17 bags of quick cement for abandonment (47-lbs/bag) and about 60 gallons of water	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					147.9-148.8' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, moderate HCl reaction, weak (R2), voids to 1/16" over 40% of surface, trace fossils to 3/16"x1/16" No Recovery 148.8-151.0' Bottom of Boring at 151.0 ft bgs on 4/23/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-19	SHEET 1 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 LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
41.3	0.0	0.7	SS-1	1-1-2 (3)	Topsoil 0.0-0.25' - brownish black, (5YR 2/1), wet, very loose, nonplastic, organics (root and plant debris) with <10% 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 sand 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 36.3	5.0	1.2	SS-2	5-5-4 (9)	Silty Sand (SM) 5.0-6.15' - grayish orange, (10YR 7/4), wet, loose, fine grained, 15% nonplastic fines, trace organics (roots), silica sand, soil grades to sandy fat clay with 30-40% fine sand at bottom of sample		Driller's Remark: Set 5' HW surface casing
10 31.3	10.0	0.8	SS-3	14-17-14 (31)	Silt (ML) 10.0-10.75' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, trace roots, carbonate derived		Driller's Remark: Set 5' HW casing (10' below ground surface)
15 26.3	15.0	1.2	SS-4	22-47-42 (89)	Silt (ML) 15.0-16.2' - Same as 10.0-10.75' except strong HCl reaction, 10-15% coarse sand-sized to fine gravel-sized limestone, all carbonate		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
21.3	20.0	1.0	SS-5	3-25-17 (42)	Silt With Limestone Fragments (ML) 20.0-21.0' - grayish orange and pale yellowish brown, (10YR 6/2 and 10YR 7/4), pale orange mottling, wet, hard, nonplastic, strong HCl reaction		Driller's Remark: Hard at 24' below ground surface
	21.5						
25	25.0	1.2	SS-6	13-13-17 (30)	Silt With Sand (ML) 25.0-26.2' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 15-20% fine to coarse sand-sized, all carbonate		
16.3	26.5						
30	30.0	0.0	SS-7	50/1.5 (50/1.5")	No Recovery 30.0-30.1'		
11.3	30.0						
35	35.0	1.4	SS-8	13-19-26 (45)	Silt With Sand (ML) 35.0-36.4' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 20-25% fine to coarse sand, limestone fragments to 1/4" at top of sample, all carbonate		
6.3	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
1.3	40.0 40.8	0.8	SS-9	30-50/4 (80/10")	Silt With Sand (ML) 40.0-40.75' - dark yellowish orange, (10YR 6/6), wet, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 25% fine to coarse grained sand, all carbonate		
45 -3.7	45.0 46.5	1.4	SS-10	27-29-50/5.5 (79/11.5")	Silt With Sand (ML) 45.0-46.4' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 15% fine to coarse sand-sized, trace gravel-sized, all carbonate		
50 -8.7	50.0 50.7	0.5	SS-11	41-50/2 (91/8")	Silt (ML) 50.0-50.5' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 10% fine to coarse grained sand, all carbonate		Driller's Remark: Hard rock 50.0-55.0', run time 15-20 minutes
55 -13.7	55.0 55.3	0.3	SS-12	50/4 (50/4")	Silt (ML) 55.0-55.25' - Same 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 Water level at 07:35 is 4.25' below ground surface
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-19	SHEET 4 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 LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-18.7	60.0	0.2	SS-13	50/3.5 (50/3.5")	Limestone Fragments And Silt (ML) 60.0-60.2' - dark yellowish orange, (10YR 6/6), nonplastic, mild to moderate HCl reaction, all carbonate		Driller's Remark: 10-15% loss in circulation at 60.5' Driller's Remark: Hard drilling at 61.0', will switch to rock coring
65 -23.7					Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log		
70 -28.7							
75 -33.7							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-19	SHEET 5 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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
61.5	R1-NQ 5 ft 91%	88	1	62.1' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight		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 No Recovery 66.05-66.5' Limestone 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 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 HCl 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 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' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl 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	5/22/07 start coring at 11:25 Driller's Remark: Cored fast (soft) at 62.0-63.0'
65 -23.7			1	63.4, 63.5' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/2" open			R1: 5 minutes
66.5			0				
			0				
			NR				
70 -28.7	R2-NQ 5 ft 85%	83	1	66.9' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight		Driller's Remark: Very soft at 69.0-70.5' R2: 7 minutes	
			0				
			0	69.05' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight			
			3	69.75' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open			
			0	70.25' - Fracture, 45 deg, smooth, undulating to planar, tight			
71.5	R3-NQ 5 ft 74%	70	NR			Driller's Remark: 25% circulation loss at 73.0-74.0', extremely soft, possible silt-filled cavity R3: 10 minutes	
			0				
			0				
			1	74.9' - Mechanical break, 0-80 deg, rough, undulating, tight, related to cavities			
			1	75.65' - Fracture, 45 deg, rough, undulating, 2" thick silty gravelly infill, tight			
75 -33.7	R4-NQ 5 ft 100%	80	1	77.35' - Bedding plane or mechanical break, horizontal, smooth, undulating, associated with cavity, tight to 1" open		Driller's Remark: Soft rock 78.5-81.5' R4: 4 minutes	
			0				
			1	78.75' - Bedding plane, 10 deg, smooth, undulating, tight			
			0				
			2				
80 -38.7							
81.5							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
85 -43.7	R5-NQ 5 ft 100%	98	0		Silt With Limestone Fragments (ML) 75.6-75.8' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, compacted, carbonate	Driller's Remark: Lost 95% circulation at 81.5' SC-1 collected at 81.5-82.8'	
			0		Limestone 75.8-76.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl 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'	
86.5			1		76.5-81.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCl reaction, weak (R2), very weak (R1) 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" 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 clay flat layer 3/8" thick at 78.7'	R5: 7 minutes	
			0		81.5-86.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 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	Driller's Remark: 100% circulation lost at 86.5' SC-2 collected at 87.5-88.55'	
90 -48.7	R6-NQ 5 ft 70%	70	1		88.5' - Fracture, 10 deg, rough, undulating, dark stain, tight	Driller's Remark: Very soft at 88.5-90.0'	
			0		81.1-81.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		
			NR		81.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	R6: 11 minutes	
91.5			>10		91.5-91.9' - Fracture zone, rounded fragments to 1-1/2" diameter, compacted silts in zone	Driller's Remark: Very soft at 92.0-93.5'	
			10		92.4' - Fracture, 60 deg, smooth, undulating, tight		
			2		92.55' - Fracture, 75 deg, smooth, undulating, tight		
95 -53.7	R7-NQ 5 ft 56%	9	2		93.0' - Fracture, 30 deg, smooth, planar, tight	Driller's Remark: Soft at 94.5-95.5'	
			NR		93.2-93.45' - Fracture zone, fragments to 1-1/2" x 1"	R7: 6 minutes	
			NR		93.75' - Fracture, <10 deg, smooth, undulating, tight		
96.5			>10		94.05' - Fracture, 15 deg, smooth, undulating, tight	Driller's Remark: Soft at 96.0-96.5'	
			2		96.5-97.0' - Fracture zone, fragments to 1-1/2" diameter		
			2		97.2' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open		
100 -58.7	R8-NQ 5 ft 30%	8	NR		97.5' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open	Driller's Remark: 99.5-100.0' only resistance in run	
			NR		97.65' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open	R8: 3 minutes	
101.5					No Recovery 90.0-91.5' Silt (ML) 91.5-91.9' - grayish orange, (10YR 7/4), very strong HCl reaction, compacted		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-19	SHEET 7 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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -63.7	R9-NQ 5 ft 100%	52	3	102.0' - Fracture, 60 deg, smooth, undulating, open (missing opposite face)	|	Limestone 91.9-93.15' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl 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% 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 HCl 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, fossil casts to 3/4" diameter over 10-15% of rock No Recovery 98.0-101.5' Limestone 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 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 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 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 molds to 3/16"x3/8" from 113.05-113.3'	SC-3 collected at 102.8-104.0'
			>10	102.1' - Bedding plane, horizontal, smooth, undulating, open (missing opposite face)			
			0	102.4-102.8' - Fracture zone, fragments to 2" x 1-1/2"			
			>10	104.8' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight			
			>10	105.1-105.8' - Fracture zone, fragments to 1" diameter			
	110 -68.7	R10-NQ 5 ft 85%	66	>10			106.05' - Fracture, 50 deg, smooth, undulating, tight to open 1/2"
				>10			106.3-106.5' - Fracture zone, fragments to 1/2" diameter
				2			106.5-106.6' - Fracture zone, fragments to 1-1/2" diameter
				0			107.2-107.55' - Fracture zone, fragments to 2" diameter
				1			110.3' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open
R11-NQ 5 ft 98%		98	NR	110.55' - Fracture, 60 deg, smooth, undulating, tight			
			1	112.0' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight			
			1	113.05' - Bedding plane, horizontal, smooth, undulating, tight			
			0	114.75' - Bedding plane, horizontal, rough, undulating, tight			
			2	115.15' - Bedding plane, horizontal, smooth, undulating, tight			
115 -73.7	R12-NQ 5 ft 99%	78	1	116.3' - Fracture, 45 deg, smooth, undulating, tight			
			0	117.05' - Bedding plane, horizontal, rough, undulating, tight			
			4	118.6, 118.75, 118.9, 119.15, 119.55, 119.65, 119.95' - Bedding plane (7), horizontal, smooth, undulating, tight			
			3				
			0				
	120 -78.7						



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
125 -83.7	R13-NQ 5 ft 100%	89	NR	6	121.9, 122.1, 122.25, 122.35, 122.4, 122.5' - Bedding plane (6), horizontal, smooth, planar to undulating, tight		Limestone 114.35-115.5' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), voids to 3/16" over 25% of rock, no visible cavities, fossil casts and molds to 3/16"x9/16" over 0-10% of rock decreasing in coverage with depth 115.5-116.2' - pale yellowish brown with moderate yellowish brown mottling, (10YR 6/2 with 10YR 5/4), medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/8" over 15% of rock, fossil casts and molds to 3/8" diameter over approximately 5% of rock, no visible cavities 116.2-116.7' - Same as 106.5-107.55' except trace fossil casts and molds to 3/16"x3/8" 116.5-117.3' - Same as 114.35-115.5' except cavities (fossil casts) to 3/4" diameter over approximately 30% of rock from 116.7-117.3' 117.3-119.55' - grayish orange, (10YR 7/4), fine grained, weak (R2), trace voids to 1/16", no visible cavities, trace fossil casts and molds to 3/16" diameter 119.55-120.3' - Same as 117.3-119.55' except increasing void coverage to 5-20% of rock and increase in fossil coverage to 5-10% 120.3-120.9' - Same as 115.5-116.2' except fossil coverage consistent 5-10% 120.9-121.45' - Same as 107.55-110.75' No Recovery 121.45-121.5' Limestone 121.5-122.25' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, medium strong (R3), interbedded with limestone that is the same as 107.55-110.75', no visible voids or fossils, cavities to 3/8" diameter with infill of 107.55-110.75' material, laminations, possible bioturbation 122.5-123.5' - very pale orange grading to moderate yellowish brown with depth, (10YR 8/2 to 10YR 5/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 0-15% of surface increasing in coverage with depth, no visible cavities, trace fossil casts and molds to 3/16"x3/8"	Driller's Remark: Soft at 120.5-121.5' Driller's Remark: Soft at 122.0-123.0' R13: 6 minutes SC-4 collected at 125.65-126.5'	
			0	0	0	0			
			0	0	0	0			
			0	0	0	0			
			0	0	0	0			
130 -88.7	R14-NQ 5 ft 77%	45	3	1	10	10	NR	126.6' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open 127.4' - Bedding plane, horizontal, smooth, planar to stepped, tight to 1/4" open 127.45' - Fracture, vertical, smooth, undulating, tight 127.5' - Bedding plane, horizontal, smooth, planar to stepped, tight to 1/4" open 129.2' - Fracture, 20 deg, smooth, undulating, tight to 1/4" open 129.4-129.55' - Fracture zone, fragments to 1" diameter 129.55, 129.85' - Bedding plane (2), horizontal, smooth, planar to stepped, tight to 1/4" open 129.9-130.0' - Fracture zone, fragments to 1/2" x 1-1/2", horizontal bedding planes 129.9, 130.0, 130.1, 130.25' - Bedding plane (4), horizontal, smooth, planar to stepped, tight to 1/4" open 131.6, 131.7, 132.1' - Bedding plane (3), horizontal, smooth, planar to undulating, tight 132.0' - Mechanical break 133.3, 133.7' - Fracture or mechanical break (2), <10 deg, rough, undulating, tight 133.9-134.0' - Fracture zone, fragments to 1" diameter 133.9, 134.0' - Bedding plane (2), horizontal, smooth, planar to undulating, tight 134.05' - Mechanical break or fracture, vertical, rough, undulating, tight 134.5' - Bedding plane, horizontal, smooth, planar to undulating, tight 134.65' - Mechanical break or bedding plane, 10 deg, smooth, undulating, tight to 1/2" open 136.65' - Fracture, 30 deg, smooth, undulating, tight 136.8' - Fracture, 80 deg, smooth, undulating, tight 137.45' - Fracture or mechanical break, 60 deg, rough, undulating, associated with cavities 138.15' - Fracture or mechanical break, 15 deg, rough, undulating, associated with cavities, tight to 1/2" open	Driller's Remark: Soft at 129.5-130.0' R14: 5 minutes Driller's Remark: Soft at 130.5-131.0' Stop coring for the day at 16:55 on 5/22/07 Begin coring for the day at 07:52 on 5/23/07
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
135 -93.7	R15-NQ 5 ft 80%	54	4	1	10	2	NR	135.5-136.5' - Bedding plane (2), horizontal, smooth, planar to undulating, tight 136.5' - Mechanical break or bedding plane, 10 deg, smooth, undulating, tight to 1/2" open 136.65' - Fracture, 30 deg, smooth, undulating, tight 136.8' - Fracture, 80 deg, smooth, undulating, tight 137.45' - Fracture or mechanical break, 60 deg, rough, undulating, associated with cavities 138.15' - Fracture or mechanical break, 15 deg, rough, undulating, associated with cavities, tight to 1/2" open	R15: 9 minutes Driller's Remark: Hard except 136.0-136.5'
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
140 -98.7	R16-NQ 5 ft 89%	68	2	1	1	10	1	139.5-140.5' - Bedding plane (2), horizontal, smooth, planar to undulating, tight 140.5' - Mechanical break or bedding plane, 10 deg, smooth, undulating, tight to 1/2" open 140.65' - Fracture, 30 deg, smooth, undulating, tight 140.8' - Fracture, 80 deg, smooth, undulating, tight 141.45' - Fracture, 80 deg, smooth, undulating, tight 141.5' - Fracture, 80 deg, smooth, undulating, tight	Driller's Remark: All fairly hard this run (R16) R16: 9 minutes
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		
			NR	NR	NR	NR	NR		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -103.7	R17-NQ 5 ft 74%	54	0	139.1' - Fracture or mechanical break, <10 deg, rough, undulating, associated with cavity, tight to 1/4" open	123.5-124.0' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, very weak (R1), voids to 1/16" over 25% of rock, no visible cavities, trace fossil casts and molds to 3/16"x1/8" 126.5-127.4' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over 15-25% of rock, no visible cavities, fossil casts and molds to 3/16"x3/8" over 0-20% of rock (variable) 127.4-127.7' - Same as 121.5-122.25' 127.7-129.6' - Same as 126.5-127.4' 129.6-130.35' - Same as 121.5-122.25' No Recovery 130.35-131.5' Limestone 131.5-131.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), trace voids to 1/16", no visible cavities or fossils 131.7-134.35' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, extremely weak to medium strong (R0 to R3), voids to 1/16" over 5-15% of rock, no visible cavities, fossil casts to 3/4"x3/8" (trace), trace laminations 134.35-134.5' - Same as 131.5-131.7' 134.5-135.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, weak (R2), voids to 1/8" over 15-25% of rock, no visible cavities, fossil casts to 9/16"x3/16" No Recovery 135.5-136.5' Limestone 136.5-139.9' - yellowish gray with light olive gray mottling, (5Y 8/1 with 5Y 6/1), fine grained, moderate to strong HCl reaction, medium strong (R3), voids to 1/16" over 5-10% of 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 coating of dark mineral with sulfur scent (possibly pyrite), most cavities with infill that is grayish orange with voids to 1/8" over 30-40% of infill area	SC-5 collected at 142.7-143.85'	
			1	139.6' - Fracture, horizontal, rough, undulating, dark stain, fracture associated with cavity, tight			
			10	139.63' - Fracture, vertical, smooth, undulating, tight			
			2	139.65-139.9' - Fracture zone, associated with cavities, fragments to 1" diameter			Driller's Remark: Soft at 144.5-145.0'
			NR	140.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open			R17: 7 minutes
146.5				142.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open			
			10	143.85-143.95' - Fracture zone, fragments to 1/2" diameter			
			4	143.9, 143.95, 144.0, 144.1, 144.3, 144.4, 144.85, 145.05' - Bedding plane (8), horizontal, smooth, undulating, tight to 1/4" open			
			3	146.6' - Bedding plane, horizontal, smooth, planar, tight			Driller's Remark: Soft at 149.5-151.5'
150 -108.7	R18-NQ 5 ft 80%	35	10	146.75-146.8' - Fracture zone, fragments to 1/2" x 1-1/2"			R18: 7 minutes
			10	146.8' - Bedding plane, horizontal, smooth, planar, tight			
			NR	147.0' - Fracture, 70 deg, smooth, undulating, tight			
				147.4' - Fracture, 70-80 deg, smooth, undulating, tight			
				147.5' - Bedding plane, 10 deg, smooth, undulating, tight		Driller's Remark: 5/23/07 at 09:00, total depth at 151.5'	
				147.7' - Fracture, 70-80 deg, smooth, undulating, tight			
				148.0' - Fracture, 70-80 deg, smooth, undulating, tight			
				148.4' - Bedding plane, horizontal, smooth, planar, tight		Driller's Remark: 5/23/07 at 14:40, water level is 3.25'	
				148.8' - Fracture, 75 deg, smooth, undulating, tight			
				149.0' - Fracture, 50 deg, smooth, undulating, tight			
				149.2' - Fracture, 75 deg, rough, undulating, tight			
				149.5' - Bedding plane, horizontal, rough, undulating, tight to 1/4" open			
				150.25-150.5' - Fracture zone, fragments to 2" diameter			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-19	SHEET 10 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
 WATER LEVELS : 4.25 ft bgs on 5/22/07 START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					139.9-140.95' - yellowish gray, (5Y 7/2), fine grained, moderate HCl 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 HCl 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 HCl 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 143.85-145.2' 147.5-150.5' - 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: 338884.FL	BORING NUMBER: B-20	SHEET 1 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 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
40.4	0.0			No Recovery 0.0-2.0'		13:45 Start drilling
	0.0	SS-1	1 (1/24")			Surface consists of grassy wetland material that is 100% saturated.
	2.0					
5	5.0					
35.4		1.1	SS-2	3-4-6 (10)		Lean clay at bottom of split spoon sample
	6.5					
10	10.0					
30.4		0.8	SS-3	0-0-1 (1)		
	11.5					
15	15.0					
25.4		1.1	SS-4	5-6-5 (11)		
	16.5					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-20	SHEET 2 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 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
20.4	20.0	1.1	SS-5	5-6-13 (19)	Silt (ML) 20.0-21.1' - Same as 15.0-16.1' except very stiff		
	21.5						
25	25.0	1.2	SS-6	14-15-10 (25)	Silt (ML) 25.0-26.2' - dusky yellow, (5Y 6/4), some mottling, wet, very stiff, nonplastic, rapid dilatancy, moderate to strong HCl reaction, all carbonate		
15.4	26.5						
30	30.0	1.4	SS-7	3-2-10 (12)	Silt With Sand (ML) 30.0-31.4' - dusky yellow, (5Y 6/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 25% fine to coarse sand-sized, 2" organic lens at top of sample, all carbonate		
10.4	31.5						
35	35.0	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 carbonate		
5.4	35.8						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-20	SHEET 3 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 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
0.4	40.0	1.5	SS-9	20-18-22 (40)	Silt With Sand (ML) 40.0-41.5' - yellowish gray, (5Y 7/2), moist, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 15-20% fine to coarse sand-sized, all carbonate		
	41.5						
45	45.0						
-4.6	45.6	0.6	SS-10	41-50/1 (100")	Silt With Sand (ML) 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	50.0						
-9.6	51.4	0.9	SS-11	24-33-50/4.5 (83/10.5)	Sandy Silt (ML) 50.0-51.4' - moderate yellowish brown, (10YR 5/4), moist, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 25-30% fine to coarse sand-sized, trace organics, all carbonate		
55	55.0						
-14.6	55.3	0.3	SS-12	50/3 (50/3")	Silt With Sand (ML) 55.0-55.3' - moderate yellowish brown, (10YR 5/4), wet, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 20% fine to coarse sand-sized, trace organics, all carbonate		End drilling for the day 05/30/07
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				65 -24.6			
-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 07:35
65 -24.6	65.0 65.2	0.0	SS-14	50/2 (50/2")	No Recovery 65.0-65.2'		Driller's Remark: Rock at 64.5'
70 -29.6	70.0	1.2	SS-15	55-25-12 (37)	Silty Gravel (GM) 70.0-71.2' - dusky yellow, (5Y 6/4), moist to wet, dense, mild to moderate HCl reaction, fine to coarse sand-sized, 31% low plastic fines, 40% fine to coarse gravel-sized limestone, all carbonate Begin Rock Coring at 71.5 ft bgs See the next sheet for the rock core log		
75 -34.6							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
71.5	R1A-NQ 1.5 ft 88%	88	0		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 10:55 Start drilling on 06/01/07	
73.0			NR				
75 -34.6	R1B-NQ 3.5 ft 37%	37	NR		Limestone 75.2-76.5' - pale olive, (10Y 6/2), medium grained, moderate HCl reaction, medium strong to strong (R3 to R4), 1/16-1/8" voids over 25-40% of surface, fossil casts and molds 76.5-79.3' - light olive gray, (5Y 5/2), medium grained, moderate to strong HCl reaction, medium strong (R3), 1/16" voids over 20-40% of surface, fossil casts and molds No Recovery 79.3-81.5'	R1B: 3 minutes 11:30 Driller's Remark: Drillers run out of water	
76.5			1	75.4' - Joint, 10 deg, rough, undulating 75.6, 76.1' - Mechanical break (2), <75 deg			
80 -39.6	R2-NQ 5 ft 56%	16	0		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 (5Y 5/2) from 85.2-85.6', mild HCl reaction, medium strong (R3), small (1/16-1/8") voids over 30-40% of surface, several large surface cavities up to 1/2" in diameter, organic stains and thin lenses throughout section No Recovery 85.6-86.5'	R2: 8 minutes R3: 4 minutes	
81.5			NR	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 78.5-78.9' - Fracture zone, 50-90 deg			
85 -44.6	R3-NQ 5 ft 82%	50	0		Limestone 86.5-91.1' - light olive gray, (5Y 6/1), medium to fine grained, moderate to strong HCl reaction, medium strong (R3), small (1/16-1/8") voids over 25-30% of surface, highly fossiliferous with molds and casts 1/4-3/4" comprising up to 30% of rock No Recovery 91.1-91.5'	SC-1 collected at 88.0-89.0' R4: 6 minutes	
86.5			NR	81.5-82.2' - Fracture zone, 60-70 deg, rough, non-planar, fragments from 3/4-3" 82.7, 83.2' - Mechanical break (2) 83.9, 84.9' - Mechanical break (2) 85.4' - Mechanical break			
90 -49.6	R4-NQ 5 ft 92%	78	0				
91.5			<10	88.0' - Mechanical break 89.9-90.3' - Fracture zone, 1/2"-1-1/2" fragments, highly fossiliferous, large cavities and molds 90.9' - Mechanical break			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 0 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
95 -54.6	R5-NQ 5 ft 68%	40	0	92.0-92.7' - Fracture zone, fragments 1/2-1" in diameter, few >1-1/2", highly fossiliferous 30-40% cavities/fossil molds	Limestone 91.5-92.8' - Same as 76.5-79.3' 92.8-93.9' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), trace voids on surface Calcareous Silt (ML) 93.9-94.0' Limestone 94.0-94.9' - dusky yellow, (5Y 6/4), medium grained, strong HCl reaction, medium strong to strong (R3 to R4) No Recovery 94.9-96.5' Limestone 96.5-98.7' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 1/16-1/8" voids over 25-40% of surface, cavities/fossil molds 1/8-3/4" in diameter over 10-20% of surface, 5-10% cavities are infilled with secondary material, fossil molds and casts No Recovery 98.7-101.5'	SC-2 collected at 92.8-93.8' R5: 5 minutes	
			0				
			2	93.6' - Joint, >5 deg, smooth, undulating 93.8' - Joint, 10-20 deg, rough, undulating, calcareous silt			
			0	94.6-94.7' - Mechanical break or fracture zone			
			NR				
100 -59.6	R6-NQ 5 ft 46%	0	0	96.7-98.2' - Fracture zone, many large fragments 3-4" with numerous smaller fragments 1/2-1" in diameter, larger fragments exhibit high angle (60-70 deg) fracture surfaces, many in conjugate pairs, rough and semi-planar	Limestone 101.5-102.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very strong (R5), trace surface voids No Recovery 102.3-108.0'	R6: 3 minutes	
			0				
			NR				
105 -64.6	R7-NQ 5 ft 16%	0	1	101.6' - Fracture, 45 deg, rough, undulating to non-planar 101.9' - Fracture, 60 deg, rough, undulating to semi-planar, intersecting 102.0' - Parting surface, horizontal	Limestone 108.0-109.2' - dusky yellow, (5Y 6/4), medium grained, strong HCl reaction, weak to medium strong (R2 to R3), 1/16-1/8" voids over 20-30% of surface No Recovery 109.2-111.5'	R7: 4 minutes	
			NR				
110 -69.6	R8-NQ 5 ft 24%	10	0	108.0' - Fracture or mechanical break, horizontal, rough, undulating		Driller's Remark: Driller noted a void space for 106.5'	
			0	108.5-109.2' - Fracture zone, fragments 1/2-1" with single fragment 3", irregular fracture surface, 3" fragment exhibits near vertical fracture surfaces			
			NR				
111.5						R8: 2 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 0 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
115 -74.6	R9-NQ 5 ft 62%	25	<10	111.5-112.2' - Fracture zone, 3/4"-1-1/2" fragments 112.2, 112.4' - Fractures or mechanical break (2), 10-15 deg, rough, undulating to semi-planar 112.6' - Fracture, horizontal, rough, planar, open 112.65' - Mechanical break, non-planar, irregular 112.9, 113.1, 113.2, 113.7, 114.4' - Fractures (5), horizontal, rough, undulating		Limestone 111.5-112.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, very weak (R1), 1/16-1/8" voids over 25% of surface 112.8-114.6' - grayish yellow, (5Y 8/4), medium grained, extremely strong HCl reaction, very weak (R1), 1/16-1/8" voids over 20% of surface, cavities/fossil molds and casts 1/8-1/2" in diameter over 5-10% of surface No Recovery 114.6-116.5'	R9: 2 minutes
116.5			0	117.5, 118.1' - Fractures (2), horizontal, rough, undulating, open		Limestone 116.5-118.1' - Same as 112.8-114.6'	SC-3 collected at 116.5-117.5'
120 -79.6	R10-NQ 5 ft 96%	60	0	118.4' - Fracture, 60 deg, non-planar 118.5' - Fracture, 5 deg, smooth, planar 118.9' - Fracture, 15 deg, rough, undulating 119.0' - Fracture, 15 deg, rough, undulating 119.1' - Fracture, vertical, irregular, tight 119.2' - Fracture, 20 deg, rough, undulating 119.7' - Fracture or mechanical break, horizontal, rough, undulating 120.0-121.3' - Fracture zone, very soft, friable, 1-4" with rough, undulating, irregular fracture surfaces		118.1-120.0' - pale greenish yellow, (10Y 8/2), medium to fine grained, extremely strong HCl reaction, very weak (R1) 120.0-121.3' - Same as 118.1-120.0' except extremely weak to weak (R0 to R2)	R10: 1 minute
121.5			4			No Recovery 121.3-121.5'	
125 -84.6	R11-NQ 5 ft 98%	43	0	122.5-126.4' - Fracture zone, fragments 1-4", rough, undulating, irregular fracture surfaces, vertical fractures intersected by irregular, non-planar, low angle fracture, non-planar		Limestone 121.5-122.5' - dusky yellow, (5Y 6/4), medium to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), fossil casts and molds 1/2-1" in diameter over 10-15% of surface, trace voids 122.5-123.5' - dusky yellow, (5Y 6/4), medium grained, strong HCl reaction, very weak (R1), trace voids 123.5-124.0' - Same as 121.5-122.5' except no fossil molds and casts 124.0-126.4' - dusky yellow, (5Y 6/4), medium grained, strong HCl reaction, weak (R2), fossil casts and molds up to 1/2" in diameter over 5-10% of surface, 1/16-1/8" voids over 15-25% of surface No Recovery 126.4-126.5'	R11: 4 minutes
126.5			3				
			5				
			NR				
			0	126.65' - Fracture, horizontal, rough 127.1' - Fracture, 15 deg, semi-planar to undulating 127.1-128.0' - Fracture zone, fragments 3/4-2", bedding plane		Limestone 126.5-128.0' - dusky yellow, (5Y 6/4), medium to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), fossil casts and molds, 1/16-1/8" voids over 50-70% of surface No Recovery 128.0-131.5'	R12: 4 minutes
130 -89.6	R12-NQ 5 ft 30%	8	<10				
			NR				
131.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 0 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
135 -94.6	R13-NQ 5 ft 60%	22	<10	131.5-132.0' - Disaggregated material 132.0' - Bedding plane, horizontal, smooth, planar 132.3, 132.6, 132.9' - Fractures or mechanical break (3), rough, undulating to non-planar 133.5' - Bedding plane, 10 deg, smooth, planar 133.6-134.4' - Fracture zone, fragments range from 1/2-2"	Silt (ML) 131.5-132.0' - yellowish gray, (5Y 7/2), strong HCl reaction, with limestone fragments Limestone 132.0-133.7' - dusky yellow, (5Y 6/4), medium to fine grained, strong HCl reaction, weak to medium strong (R2 to R3) 133.7-134.5' - dusky yellow, (5Y 6/4), medium grained, moderate HCl reaction, extremely weak (R0), 1/16-1/8" voids over 50% of surface No Recovery 134.5-136.5'	Finish drilling for the day at 17:30 on 06/01/07 Start drilling at 07:55 on 06/03/07 R13: 3 minutes	
140 -99.6	R14-NQ 5 ft 86%	40	<10	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 137.3' - Fracture, 45 deg, rough to stepped, non-planar 137.5, 138.4, 138.7, 139.0' - Fractures or mechanical break (4), 0-10 deg, rough, undulating to semi-planar 139.0-140.8' - Fractures, rough, undulating to 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 surfaces (more prevalent with depth)	Limestone 136.5-137.2' - Same as 133.7-134.5' except very weak (R1) 137.2-139.0' - light olive gray, (5Y 6/1), fine grained, moderate to strong HCl reaction, strong to very strong (R4 to R5), trace 1/16" voids across surface, cavities/fossil molds up to 3/4" in diameter over 5% of rock concentrated in 1-2" zones (up to 30%), numerous fossil casts and molds 139.0-140.8' - yellowish gray, (5Y 7/2), medium to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), dark brown/black staining on fracture, 1/16-1/8" voids over 10% of surface No Recovery 140.8-141.5' Limestone 141.5-141.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, strong (R4), trace cavities on surface 141.7-141.8' - Same as 141.5-141.7' except voids 141.8-143.6' - Same as 141.5-141.7' 143.6-145.0' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), 1/16" voids over up to 50% of surface, cavities/fossil molds up to 1/2" in diameter over <5% of rock No Recovery 145.0-146.5' Limestone 146.5-147.3' - moderate yellowish brown, (10YR 5/4), medium grained, mild to strong HCl reaction, very weak (R1), finely laminated, wavy bedding planes, 1/16" voids over 10-20% of surface, one 1" surface cavity	R14: 7 minutes SC-4 collected at 142.2-143.1' R15: 7 minutes	
145 -104.6	R15-NQ 5 ft 70%	50	NR	141.7' - Fracture, horizontal, rough, undulating 142.2' - Bedding plane, 5 deg, smooth, planar 143.7' - voids 143.7, 143.8, 143.9' - Fractures (3), horizontal, rough, undulating 144.2' - Mechanical break, rough to stepped, undulating to non-planar 144.5, 144.7, 145.0' - Fractures or mechanical break (3), horizontal, rough, undulating 145.1' - Bedding plane, horizontal, smooth, planar	No Recovery 140.8-141.5' Limestone 141.5-141.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, strong (R4), trace cavities on surface 141.7-141.8' - Same as 141.5-141.7' except voids 141.8-143.6' - Same as 141.5-141.7' 143.6-145.0' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), 1/16" voids over up to 50% of surface, cavities/fossil molds up to 1/2" in diameter over <5% of rock No Recovery 145.0-146.5' Limestone 146.5-147.3' - moderate yellowish brown, (10YR 5/4), medium grained, mild to strong HCl reaction, very weak (R1), finely laminated, wavy bedding planes, 1/16" voids over 10-20% of surface, one 1" surface cavity	SC-4 collected at 142.2-143.1' R15: 7 minutes	
150 -109.6	R16-NQ 5 ft 100%	67	0	146.6, 146.7, 146.75, 147.0, 147.2, 147.3, 147.6' - Fractures (7), 0-5 deg, rough, undulating, bedding plane partings	No Recovery 145.0-146.5' Limestone 146.5-147.3' - moderate yellowish brown, (10YR 5/4), medium grained, mild to strong HCl reaction, very weak (R1), finely laminated, wavy bedding planes, 1/16" voids over 10-20% of surface, one 1" surface cavity	11:30 Driller's Remark: Drillers run out of water, go to refill water tank 13:30 Driller's Remark: Refill drill with water SC-5 collected at 147.9-148.8'	
151.5			0	150.2' - Fracture, 70 deg, rough, undulating, mostly planar 150.8' - voids		R16: 4 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 LEVELS : 0 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
				151.0, 151.2, 151.25' - Fractures (3), <5 deg, rough, undulating, bedding plane partings	147.3-150.8' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, strong (R4), trace fossil molds and casts 1/2" on surface 150.8-151.5' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), 1/8-3/16" voids over 50% of surface Bottom of Boring at 151.5 ft bgs on 6/3/2007	09:00 Finish drilling on 06/03/07 11:30 Driller's Remark: Drillers run out of water, go to refill water tank 13:30 Driller's Remark: Refill with water	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-21	SHEET 1 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
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) 0.5-1.5' - light gray, (N7), moist, loose, very fine to fine grained, 5% fines, nonplastic, organics decreasing with depth, sand is silica		Split spoon sampling begins at 15:13 Driller's Remark: Spade bit used to 15.0'
	1.5					
5 36.8	5.0	6.5	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 31.8	10.0	11.5	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 bit
	11.5					
15 26.8	15.0	15.8	SS-4	30-50/3 (80/9") Limestone Fragments 15.0-15.3' - Same as 10.0-10.3' except fragments up to 1/2" 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		
	15.8					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
21.8	20.0	1.3	SS-5	36-30-8 (38)	Silty Sand With Limestone Fragments (SM) 20.0-21.25' - very pale orange, (10YR 8/2), moist, dense, fine to coarse grained, 37% fines, low plasticity, moderate HCl reaction, 30% fine gravel-sized limestone fragments, all carbonate derived	| | | | |	End drilling on 5/30/07 Begin drilling on 5/31/07 at 07:45
	21.5						
25	25.0	0.9	SS-6	15-22-18 (40)	Silt With Sand (ML) 25.0-25.9' - grayish orange, (10YR 7/4), moist, hard, trace% gravel, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 15% fine to medium grained sand, trace fine grained gravel, all carbonate derived	| | | | |	Driller's Remark: Harder material at 34.5', drill chatter
16.8	26.5						
30	30.0	1.0	SS-7	10-19-20 (39)	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-25.9'	| | | | |	
11.8	31.5						
35	35.0	0.2	SS-8	50/2 (50/2")	Limestone Fragments 35.0-35.2' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, angular fragments to 1/4"	| | | | |	Driller's Remark: Hard material Casing set to 35.0'
6.8	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-21	SHEET 3 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
1.8	40.0	1.4	SS-9	21-21-21 (42)	Silt (ML) 40.0-41.4' - pale yellowish brown, (10YR 6/2), moist, hard, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 10-15% fine to medium grained sand, all carbonate derived		
	41.5						
45	45.0	0.8	SS-10	61-50/3 (111/9")	Silty Sand With Limestone Fragments (SM) 45.0-45.8' - pale yellowish brown, (10YR 6/2), moist, very dense, fine to coarse grained, 35% fines, low plasticity, moderate HCl reaction, 15% fine to coarse grained gravel, all carbonate derived		End drilling on 5/31/07 Begin drilling on 6/1/07 at 07:30
-3.2	45.8						
50	50.0	1.2	SS-11	1-2-50/4 (52/10")	Sandy Silt With Limestone Fragments (ML) 50.0-51.2' - pale yellowish brown, (10YR 6/2), moist, hard, nonplastic to low plasticity, rapid dilatancy, mild to moderate HCl reaction, 30% fine to coarse grained sand, 35% fine grained gravel, all carbonate derived		
-8.2	51.3						
55	55.0	1.4	SS-12	19-31-39 (70)	Sandy Silt With Limestone Fragments (ML) 55.0-56.4' - pale yellowish brown, (10YR 6/2), moist, hard, low plasticity, rapid dilatancy, 35% fine to coarse grained sand, laminated black organic layers at 55.3-55.5', fine to coarse gravel-sized limestone fragments in last 0.25', mild to moderate HCl reaction in all materials (except organics)		
-13.2	56.5						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-21	SHEET 4 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
-18.2	60.0	1.2	SS-13	19-35-28 (63)	Silty Sand (SM) 60.0-61.2' - pale yellowish brown, (10YR 6/2), moist, hard, medium plasticity, rapid dilatancy, moderate to mild HCl reaction, limestone from 60.0-60.7' and 61.1-61.2', elastic silt lens from 60.7-61.1' (dark yellowish brown [10YR 4/2]), all carbonate derived		Driller's Remark: Harder material at 62.0-63.0'
65	61.5						
-23.2	65.0	0.3	SS-14	50/4 (50/4")	Limestone And Sandy Silt (ML) 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		
70	65.3						
-28.2	70.0	0.8	SS-15	17-6-9 (15)	Sandy Silt (ML) 70.0-70.4' - pale yellowish brown, (10YR 6/2), moist, hard, low plasticity, rapid dilatancy, moderate HCl reaction, 25-30% fine to coarse grained sand, all 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		
75	71.5						
-33.2	75	1.5	SS-16	21-2-3 (5)	Limestone Fragments And Silty Sand (SM) 75.0-76.5' - Same as 70.0-70.8' except limestone fragments from coarse sand to coarse gravel mixed with carbonate derived silts and sands		Driller's Remark: 100% water loss 75.0-76.5' at 6 blow count level, very soft material
80	76.5				Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log		



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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-33.2	75.0						
	R1-NQ 2 ft 0%	0	NR		No Recovery 75.0-77.0'	R1: Run time not recorded	
	77.0						
	R2-NQ 5 ft 35%	35			Limestone 77.0-78.75' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild HCl reaction, weak (R2), voids (3/16") over 15-20% of rock surface, trace cavities up to 9/16"x3/8" No Recovery 78.75-82.0'	R2: 9 minutes	
80							
-38.2							
	82.0						
	R3-NQ 5 ft 64%	51			Limestone 82.0-85.2' - Same as 77.0-78.75' except moderate yellowish brown, (10YR 5/4), 5-10% partially infilled cavities 3/4" x 1-3/16"		
85							
-43.2					No Recovery 85.2-87.0'	Driller's Remark: Casing advanced to 85.0' Driller's Remark: Using polymer EZ mud (not bentonite quick gel) R3: 18 minutes Drilling ends on 6/01/2007, no drilling on 6/02/07 due to rain Drilling begins on 6/03/07 at 07:35 SC-1 collected at 88.0-89.1' Driller's Remark: Circulation loss at 89.0'	
	87.0						
	R4-NQ 5 ft 58%	25			Limestone 87.0-89.9' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), small voids (1/16"-1/8") over 5-15% of rock surface increasing with depth. At 87.0-88.0': 25% cavities/casts up to 1" x 1-3/16", highly fossiliferous. At 88.0-89.9 trace cavities up to 3/4"x3/8", partially infilled with recrystallized carbonate, some with black staining, moderate HCl reaction 88.0-89.9' - voids (1/16"-1/8") over 5-15% of rock surface (increasing with depth) No Recovery 89.9-92.0' Limestone 92.0-93.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), cavities (1" x 1-3/16") over 25% of rock surface, highly fossiliferous	R4: 18 minutes	
90							
-48.2							
	92.0						
	R5-NQ 5 ft 44%	15					
95							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-21	SHEET 6 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-53.2			NR		93.0-93.2' - pale yellowish brown, (10YR 6/2), fine grained, medium strong (R3), voids over 0-3% of rock surface, no cavities	Driller's Remark: No circulation	
97.0			>10		93.2-94.2' - voids (1/16-1/8") over 5-15% of rock surface (increasing with depth), trace cavities up to 3/4"x3/8", partially infilled with recrystallized carbonate, some with black staining, moderate HCl reaction	R5: 22 minutes	
100	R6-NQ 5 ft 41%	23	2		No Recovery 94.2-97.0' Limestone		
-58.2			NR		97.0-97.1' - Fracture zone, limestone rock fragments from 3/4"-1.5"		
102.0			NR		97.8-97.95' - Fracture zone, limestone rock fragments from 1/2"-1"		
105	R7-NQ 5 ft 2%	0	0		98.4-98.5' - Fracture or mechanical break, 30 deg, rough, stepped		
-63.2			NR		98.75' - Fracture, <10 deg, rough, undulating, open	Driller's Remark: Cavity at 100.5-104.0' R6: 21 minutes	
107.0			NR		No Recovery 99.05-102.0' Limestone		
105			NR		97.0-99.05' - Same as 88.0-88.9' except cavities 1-3/16" x 2" infilled with fine grained material, voids over 3% of rock surface, medium light gray (N6) to grayish orange (10YR 7/4) infilling increases with depth from 5% at 97.0' to 40% at 99.05'		
105			NR		No Recovery 102.0-104.0' Cavity		
105	R7-NQ 5 ft 2%	0	0		Limestone		
-63.2			NR		104.0-104.1' - Same as 88.0-88.9' except no infilling, voids over 10% of rock surface, no cavities	R7: 4 minutes	
107.0			>10		No Recovery 104.1-107.0' Limestone		
110	R8-NQ 5 ft 74%	23	2		107.0-107.3' - Fracture zone		
-68.2			>10		107.6' - Fracture or mechanical break, 45 deg, rough, undulating, open		
110			>10		107.85' - Fracture or mechanical break, horizontal, rough, undulating, 2 inch open		
110			>10		108.0' - Fracture or mechanical break, 45 deg, rough, undulating, open		
110			NR		108.4' - Fracture or mechanical break, horizontal, rough, undulating, open		
110			>10		108.5' - Fracture or mechanical break, 45 deg, rough, undulating, open		
110			NR		109.25-110.7' - Fracture zone, 60 deg and 80 deg, limestone rock fragments from 3/4"-2"	R8: 15 minutes	
112.0			>10		No Recovery 110.7-112.0' Limestone	Driller's Remark: Water level at 3.5'	
115	R9-NQ 5 ft 55%	22	1		112.0-112.85' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild HCl reaction, weak (R2), voids (1/16") over 5-10% of rock surface, no visible cavities	Driller's Remark: Hole collapse, advanced NW casing to 106.0', end drilling on 6/03/07 at 17:00 Driller's Remark: Circulation loss at 113.0', drilling soft, not like a cavity	
115			>10		112.25, 112.3' - Fracture (2), horizontal, rough, undulating, open		
115			>10		112.4-113.0' - Fracture zone, limestone rock fragments from 1"-1.5"		
115			1		113.55' - Fracture, 60 deg, rough, planar, open, black staining		
115					113.7-114.0' - Fracture zone, limestone rock fragments from 1.5"-3"		



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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-73.2			NR		112.85-113.45' - Same as 112.0-112.85' except pale yellowish brown, (10YR 7/4), trace cavities up to 3/8"x3/8"	Drilling resumes on 6/04/07 at 07:20 R9: 15 minutes	
117.0			4		113.45-114.75' - medium gray to grayish orange, (N5 to 10YR 7/4), cavities (up to 3/8") over less than 5% of rock surface		
			3		No Recovery 114.75-117.0' Limestone	Driller's Remark: Soft zones at 117.5-118.5, 119.0-120.0'	
120	R10-NQ 5 ft 31%	8	NR		117.0-117.7' - medium gray, (N5), fine to medium grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (up to 3/16") over 10% of rock surface, trace cavities up to 3/8"		
-78.2			NR		117.7-118.55' - Same as 112.0-112.85'	R10: 10 minutes	
					No Recovery 118.55-122.0'		
122.0			>10		Limestone 122.0-123.1' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), voids (up to 1/16") over 10% of rock surface, trace cavities up to 3/8"x3/16"	Driller's Remark: Numerous 3"-6" soft zones in R11	
					No Recovery 123.1-127.0'		
125	R11-NQ 5 ft 22%	14	NR		Limestone 127.0-127.1' - pale yellowish brown, (10YR 6/2), fine to medium grained, mild HCl reaction, weak (R2), voids (1/16") over 5-10% of rock surface	Driller's Remark: Cavity from 125.5-128'	
-83.2					127.1-128.35' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), voids (up to 1/16") over 10% of rock surface, trace cavities up to 3/8"x3/16"	R11: 6 minutes	
					No Recovery 128.35-132.0'		
127.0			>10		Limestone 132.0-132.6' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), fine to medium grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 15% of rock surface, cavities (3/8"x1/16") over 5-10%	Driller's Remark: Several soft zones, probably not cavities	
			2		No Recovery 132.6-137.0'		
			7			R12: 12 minutes	
130	R12-NQ 5 ft 27%		NR				
-88.2							
132.0			1				
135	R13-NQ 5 ft 12%	8	NR			Driller's Remark: Cavities from 133.5-135.0' and 135.5-136.0'	



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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-93.2								
137.0								
140	R14-NQ 5 ft 92%	44	>10	137.0-137.15' - Fracture zone, limestone rock fragments up to 1"		Limestone 137.0-138.8' - medium light gray, (N6), fine grained, strong HCl 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 HCl 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 HCl 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 HCl 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 HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") over 15% of rock surface, cavities (1/16"x3/16") trace 147.85-150.2' - 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 (R2 to R3), voids (up to 1/16") over 15% of rock surface, cavities (3/16"x3/4") over 15-20%	R13: 9 minutes	
-98.2			1	137.65' - Fracture, horizontal, rough, undulating, open 3/4" likely due to large cavity				
			4	138.7-138.95' - Fracture, 60 deg, rough, undulating, open				
			>10	138.75, 139.15, 140.4' - Mechanical break (3) 139.05, 139.4, 139.8' - Fractures (3), 15 deg, rough, undulating, open				
			0	139.9-140.8' - Fracture zone				
			NR					
			>10	142.0-142.15' - Fracture zone, fragments up to 1"				
			0	142.7' - Fracture, horizontal, rough, undulating, open				
145	R15-NQ 5 ft 66%	48	NR					
-103.2			1	145.9' - Fracture, horizontal, rough, undulating, open				
			2	146.5, 146.7' - Fractures (2), horizontal, rough, undulating, open				
			>10	147.0-147.1' - Fracture, horizontal, rough, undulating, open				
			0	147.5-147.85' - Fracture zone, limestone rock fragments from 1/2"-1"				
150	R16-NQ 5 ft 86%	33	3	149.15' - Fracture, horizontal, rough, undulating, open				
-108.2			>10	149.3-149.6' - Fractures or mechanical break, 30 deg and 20 deg, smooth, planar, open				
			0	150.2-150.6' - Fracture zone				
			NR	150.9-151.1' - Fracture zone, limestone rock fragments from 3/4"-1.5"				
152.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-21	SHEET 9 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 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					No Recovery 151.3-152.0' Bottom of Boring at 152.0 ft bgs on 6/4/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-22	SHEET 1 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
 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 : 1.61 ft bgs on 6/14/07 START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
40.5	0.0	0.7	SS-1	0-0-1 (1)	Topsoil 0 to 0.7' - dusky brown, (5YR 2/2), wet, very soft		Boring drilled in wetlands area
	1.5						Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels not recorded during drilling
5	5.0						
35.5		0.9	SS-2	4-3-5 (8)	Poorly Graded Sand (SP) 5.0-5.9' - moderate brown to grayish orange pink, (5YR 4/4 to 5YR 7/2), mottled, wet, loose, fine grained, trace non-plastic fines, grading into clayey sand (SC) with 30% low to medium plasticity fines		
	6.5						
10	10.0						5/19/07, 15:00, set 6" casing to 9.5'
30.5		1.0	SS-3	3-4-7 (11)	Silt (ML) 10.0-11.0' - grayish orange, (10YR 7/4), wet, stiff, very rapid dilatancy, strong HCl reaction, trace sand, carbonate, sands are fine to grained		
	11.5						
15	15.0						
25.5		1.2	SS-4	13-13-10 (23)	Silt (ML) 15.0-16.2' - very pale orange, (10YR 8/2), wet, very stiff, 10 to 15% sand, very rapid dilatancy, strong HCl reaction, carbonate, 10-15% fine gravel-sized limestone fragments		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-22	SHEET 2 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
 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 : 1.61 ft bgs on 6/14/07 START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
20.5	20.0	0.8	SS-5	18-5-4 (9)	Silt With Sand (ML) 20.0-20.8' - very pale orange, (10YR 8/2), wet, stiff, 15 to 20% sand, nonplastic, very rapid dilatancy, strong HCl reaction, carbonate, sand is fine to medium grained		
	21.5						
25	25.0	1.0	SS-6	6-6-4 (10)	Silt With Sand (ML) 25.0-26.0' - grayish orange, (10YR 7/4), wet, stiff, 10 to 15% gravel, 25% sand, nonplastic, rapid dilatancy, mild to moderate HCl reaction, carbonate, sand is fine to coarse grained, gravel is fine grained		
15.5	26.5						
30	30.0	1.5	SS-7	32-28-50 (78)	Silt With Sand (ML) 30.0-31.5' - grayish orange, (10YR 7/4), wet, hard, 27% sand, nonplastic, very rapid dilatancy, moderate HCl reaction, carbonate, sand is fine to medium grained		Heavy chattering at 30.0' 15 minutes to drill to 35.0'
10.5	31.5						
35	35.0	0.5	SS-8	15-50/6 (65/12")	Sandy Silt With Limestone Fragments (ML) 35.0-35.5' - pale yellowish orange, (10YR 6/2), gray 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		Hard and soft drilling 35- 40'
5.5	36.0						
40							



PROJECT NUMBER: 338884.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
 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 : 1.61 ft bgs on 6/14/07 START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
0.5	40.0	1.3	SS-9	5-4-6 (10)	Silt With Sand (ML) 40.0-41.3' - moderate yellowish brown, (10YR 5/4), wet, stiff, 26% sand, nonplastic, very rapid dilatancy, mild HCl reaction, carbonate, sand is fine grained		
	41.5						
45	45.0	1.0	SS-10	3-3-2 (5)	Sandy Silt (ML) 45.0-46.0' - moderate yellowish brown, (10YR 5/4), wet, medium stiff, 25 to 30% sand, nonplastic, very rapid dilatancy, mild HCl reaction, sand is fine to medium grained		Medium chattering/grinding Lost and regained 80-90% of circulation
-4.5	46.5						
50	50.0	1.4	SS-11	7-3-3 (6)	Silty Sand With Limestone Fragments (SM) 50.0-51.4' - dark yellowish brown, (10YR 4/2), wet, loose, fine to coarse grained, 23% fines, moderate HCl reaction, 40% limestone fragments, limestone is moderate yellowish brown (10YR 5/4) with mild to moderate HCl reaction		5/20/07, 08:45 to 10:15, set HW casing to 50.0'
-9.5	51.5						
55	55.0	1.2	SS-12	3-3-7 (10)	Silty Sand With Limestone Fragments (SM) 55.0-56.15' - dark yellowish brown to pale yellowish brown, (10YR 4/2 to 10YR 6/2), wet, medium dense, mild to moderate HCl reaction, fine to coarse grained, 25-30% fines, 35% limestone fragments		Heavy grinding, lost 80-90% of circulation at 57'
-14.5	56.5						
60							



PROJECT NUMBER: 338884.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
 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 : 1.61 ft bgs on 6/14/07 START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-19.5	60.0	1.2	SS-13	4-17-32 (49)	Limestone Fragments 60.0-61.2' - grayish orange and olive gray, (10YR 7/4 and 5Y 4/1), mild to moderate HCl reaction, fine to coarse gravel-sized fragments, 25% silt and sand similar to SS-12		5/20/07, 11:15, begin to set casing to 60.0'
	61.5						
65	65.0	0.9	SS-14	6-6-3 (9)	Silty Sand With Limestone Fragments (SM) 65.0-65.9' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, loose, mild to moderate HCl reaction, fine to coarse grained, 28% fines, 40-50% limestone fragments		
-24.5	66.5						
70	70.0	1.4	SS-15	12-14-10 (24)	Silty Sand With Limestone Fragments (SM) 70.0-71.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, medium dense, mild to moderate HCl reaction, fine to coarse grained, 30% fines, 40-50% limestone fragments		60% circulation loss
-29.5	71.5						
75	75.0	0.1	SS-16	50/2 (50/2")	Limestone Fragments 75.0-75.1' - pale yellowish brown, (10YR 6/2), fragments up to 1-3/16 " Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log		5/20/07, 15:30, begin to advance HW casing to 75'
-34.5	75.1						
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
 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 : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-34.5	75.0						
	R1-HQ 5 ft 34%	20	>10		Limestone 75.0-75.5' - very pale orange, (10YR 8/2), strong HCl reaction, medium strong (R3), moderately fossiliferous, voids up to 1/4" over 20-30% of surface 75.5-76.7' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/8" over 20-30% of surface No Recovery 76.7-80.0'	Begin rock coring on 5/21/07 at 08:02 R1: 5 minutes	
80	80.0						
-39.5	R2-HQ 5 ft 62%	23	>10		Limestone 80.0-83.1' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very weak to weak (R1 to R2), trace solution cavities up to 3/8", moderately fossiliferous, 10-20% voids up to 1/16", 5-10% silt No Recovery 83.1-85.0'	SC-1 collected at 81.1-81.95' R2: 5 minutes	
85	85.0						
-44.5	R3-HQ 5 ft 32%	20	2		Limestone 85.0-86.6' - Same as 80.0-83.1' except solution cavities up to 9/16" over 5-10% of surface No Recovery 86.6-90.0'	Driller's Remark: Drilling is soft 85.0-87.5' Driller's Remark: Core barrel has no resistance at 88.0-90.0' R3: 5 minutes	
90	90.0						
-49.5	R4-HQ 5 ft 4%	0	1		Limestone 90.0-90.2' - Same as 80.0-83.1' No Recovery 90.2-95.0'	Driller's Remark: No resistance to drilling 90.0-95.0' R4: 2 minutes	
95	95.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-22	SHEET 6 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
 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 : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-54.5	R5-HQ 5 ft 26%	>10	>10	95.0-96.3' - Fracture zone, multiple fractures and mechanical breaks, fragments range from 0.05' in length to 0.4' in length	Limestone 95.0-96.3' - pale yellowish brown, (10YR 6/2), very strong HCl reaction, very weak to weak (R1 to R2), 30% voids up to 1/4", 20-30% silt No Recovery 96.3-100.0'	R5: 3 minutes	
100		0	NR				
-59.5	R6-HQ 5 ft 30%	>10	1	100.0-101.0' - Fracture zone, irregular fragments 101.2' - Fracture, 50-60 deg, rough, planar, open	Silty Clay (CL) 100.0-100.5' - pale yellowish brown, (10YR 6/2), stiff to very stiff, moderate plasticity, strong HCl reaction, carbonate Limestone 100.5-101.5' - light brown, (5YR 6/4), strong HCl reaction, extremely weak to very weak (R0 to R1), 10-20% voids up to 1/16", poorly fossiliferous No Recovery 101.5-105.0'	R6: 3 minutes	
105		0	NR				
-64.5	R7-HQ 5 ft 78%	>10	2	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 voids, poorly fossiliferous, silty No Recovery 108.9-110.0'	SC-2 collected at 105.7-106.8' Driller's Remark: Hard at 109.0' R7: 5 minutes	
105		22	>10	106.8' - Fracture, rough, stepped, 3/8" relief on face of fracture 106.9' - Fracture, smooth, stepped, 5/16" relief			
110		>10	NR	107.0-108.0' - Fracture zone, rough, planar, less than 1/8" infilling 108.0-108.9' - Fracture zone, rough, planar, fractures and mechanical breaks			
110		NR					
-69.5	R8-HQ 5 ft 28%	>10	0	110.0-110.2' - Fractures (2), horizontal and vertical, rough, undulating 110.8-111.0' - Fractures, multiple, irregular gravel-size pieces, 0.1' to 0.2' in size	Limestone 110.0-110.2' - grayish orange, (10YR 7/4), strong HCl reaction, very weak to weak (R1 to R2), 10-15% voids up to 1/16", silty 110.2-111.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, weak (R2), 20-30% voids up to 3/16" 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		7	NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-74.5	R9-HQ 5 ft 30%	>10		<p>Limestone 115.0-115.35' - pale yellowish brown, (10YR 6/2), strong HCl reaction, extremely weak (R0), 20-30% voids <1/16"</p> <p>115.35-116.0' - Same as 115.0-115.35' except grayish orange, (10YR 7/4)</p> <p>Silt And Sand-Sized Carbonate Grains With Clay 116.0-116.5' - medium gray, (N5), nonplastic to low plasticity, trace solution cavities up to 3/8", unconsolidated</p> <p>No Recovery 116.5-120.0' Silt And Sand-Sized Carbonate Grains With Clay 120.0-120.4' - Same as 116.0-116.5'</p>	Disaggregated limestone		
120		3	115.7, 116.0' - Fractures (2), horizontal, rough, planar, horizontal				
120	R10-HQ 5 ft 42%	17	NR	<p>120.45' - Fracture, 30 deg, rough, planar, lithologic contact</p> <p>120.6' - Fracture, 30 deg, rough, planar</p> <p>121.0, 121.3, 121.45, 121.5, 121.55, 121.6,' - Fractures (6), horizontal, smooth, planar</p>	R9: 2 minutes		
-79.5		2					
125		6					
125	R11-HQ 5 ft 18%	20	NR	<p>120.4-121.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, extremely weak (R0), 20-30% voids up to 1/16"</p> <p>121.0-121.65' - pale yellowish brown, (10YR 6/2), medium grained, 10-20% fines, strong HCl reaction, very weak to weak (R1 to R2), 20-30% voids up to 1/16", poorly fossiliferous, cyclic bedding</p> <p>121.65-122.1' - coarse grained, weak HCl reaction, very weak (R1), 5-10% solution cavities, 20-30% voids, highly fossiliferous</p> <p>No Recovery 122.1-125.0' Limestone 125.0-125.25' - yellowish gray, (15Y 7/2), coarse grained, mild to moderate HCl reaction, very weak (R1), trace solution cavities up to 1/4", 10-20% voids up to 3/16"</p> <p>125.25-125.5' - Same as 125.0-125.25' except pale yellowish brown, (10YR 6/2)</p> <p>125.5-125.9' - Same as 125.0-125.25'</p>	R10: 3 minutes		
-84.5		3	125.1' - Fracture, horizontal, rough, planar, 1/16" thick infilling, open 125.25' - Fracture, horizontal, rough, undulating, 1/16" thick infilling, open				
130	R12-HQ 5 ft 60%	12	NR	<p>No Recovery 125.9-130.0' Silty Clay (CL) 130.0-103.3' - dark yellowish orange, (10YR 6/6), stiff, mild to moderate HCl reaction</p> <p>Poorly Graded Sand (SP) 130.3-131.6' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), fine to coarse grained, slow HCl reaction</p>	R11: 2 minutes		
-89.5		>10	130.0-132.0' - Mechanical break, multiple				
		>10					
		>10	132.1' - Fracture, horizontal, rough, undulating 132.5-132.8' - Fracture zone, multiple breaks, infilling				
135			NR		R12: 5 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-22	SHEET 8 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
 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 : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-94.5	R13-HQ 5 ft 66%	0	>10	135.0-138.3' - Mechanical break, multiple	Limestone 131.6-133.0' - grayish orange, (10YR 7/4), moderate to strong HCl reaction, very weak to weak (R1 to R2), trace solution cavities up to 5/16", 20-30% voids up to 1/16", poorly to moderately fossiliferous, 20-30% silt No Recovery 133.0-135.0' Limestone 135.0-135.3' - grayish orange, (10YR 7/4), moderate to strong HCl reaction, very weak to weak (R1 to R2), trace solution cavities up to 5/16", 20-30% voids up to 1/16", poorly to moderately fossiliferous, 20-30% silt No Recovery 138.3-140.0' Limestone 140.0-140.5' - grayish orange and pale yellowish brown, (10YR 7/4 and 10YR 6/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), laminated bedding 140.5-140.8' - dark yellowish brown, (10YR 4/2), no HCl reaction, extremely weak to very weak (R0 to R1), laminated bedding, 10-15% small (<1/16") voids, 30-40% cavities (<3/8"), moderately fossiliferous, silty 140.8-143.0' - Same as 140-140.5' 143.0-144.7' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), 20-30% voids <1/16", moderately fossiliferous, silty No Recovery 144.7-145.0' Limestone 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 to R3), trace cavities and voids	R13: 8 minutes		
140			>10					
-99.5			140.0	28			3	140.2, 140.4, 140.75' - Fractures (3), rough, planar, along weak contact
							1	141.2' - Fracture, 60-70 deg, smooth, planar
			2	141.8' - Fracture, horizontal, rough, planar, infilling				
			>10	142.6' - Fracture, 60-70 deg, smooth, planar				
			5	142.9' - Mechanical break, rough, along weak contact				
			NR	143.1-144.7' - Fracture zone, possible mechanical breaks				
145	R14-HQ 5 ft 94%	28	3	145.2-145.4' - Fractures, gravel-sized pieces	R14: 5 minutes			
-104.5			0	145.85-145.95' - Fractures, horizontal, rough, planar, open				
			0	146.4-146.5' - Mechanical break, multiple				
			>10	147.15' - Mechanical break				
			53	148.4-148.75' - Mechanical break	SC-3 collected at 148.15-149.05' (SC-3 depth adjusted from 148.5-149.05' due to change in accounting for core loss) R15: 5 minutes			
			0	148.9' - Fracture, horizontal, rough, planar, open, fragments don't fit together				
			NR					
150	R15-HQ 5 ft 84%	53	>10		Total depth of boring 150.0'			
-109.5			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-22	SHEET 9 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

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 : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					148.8-149.2' - moderate yellowish 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		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 1 OF 9
SOIL BORING 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
 DRILLING 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 bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
40.7	0.0	1.0	SS-1	2-2-5 (7)	Fill 0.0-0.3' - Fill material, road import fill 0.3-0.5' wood fragments Poorly Graded Sand With Silt (SP-SM) 0.5-1.0' - brownish black, (5YR 2/1), moist, loose, fine grained, no HCl reaction, lighter color with depth, 5-10% nonplastic fines, some fines may be organics, silica sand		Driller use 10' section of NWJ rod then AWJ rods for SPT sampling. S. Hutchinson performed cathead hammer work for all samples drilling with 3-15/16" tricone bit.
35.7	5.0	1.5	SS-2	4-4-3 (7)	Poorly Graded Sand With Sand (SP-SM) 5.0-6.5' - moderate yellowish brown, (10YR 5/4), wet, loose, fine grained, no HCl reaction, 5% nonplastic fines, trace organics, silica sand		
10	10.0	1.2	SS-3	6-13-14 (27)	Silty Sand (SM) 10.0-11.2' - light olive gray, (5Y 6/1), wet, medium dense, fine grained, no HCl reaction, 25-30% low to nonplastic fines, silica sand		Material in shoe was more fines with higher plasticity
15	15.0	0.7	SS-4	5-14-16 (30)	Interbedded Silty Sands And Sandy Clay (SM-CL) 15.0-15.3' - white to medium light gray to greenish gray, (N9 to N7 to 5G 6/1), wet, medium dense, fine grained, moderate to strong HCl reaction, low to nonplastic fines in silty sands, medium to high plastic fines in sandy clay, beds 1/4" thick, (2) 1"-2" limestone pieces embedded in material, both carbonate material Silt (ML) 15.3-15.5' - yellowish gray, (5Y 6/1), wet, hard to stiff, low plasticity, moderate HCl reaction, carbonate material Limestone Fragments 15.5-15.7' - moderate to strong HCl reaction, mottled appearance		
20	16.5						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 2 OF 9
SOIL BORING 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
 DRILLING 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 bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
20.7	20.0	0.7	SS-5	14-41-35 (76)	Silt With Sand (ML) 20.0-20.7' - yellowish gray, (5Y 8/1), wet, hard, low plasticity, mild to moderate HCl reaction, 15-20% sand size particles, carbonate materials		
	21.5						
25	25.0	1.0	SS-6	27-40-50/5 (90/11)	Silt With Sand (ML) 25.0-26.0' - grayish orange, (10YR 7/4), wet, hard, nonplastic, mild to moderate HCl reaction, 26% fine to medium sand size material, carbonate materials		
15.7	26.4						
30	30.0	1.0	SS-7	10-19-22 (41)	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-26.0'		Driller's Remark: 20'-35' drills hard but not rock, just fairly dense
10.7	31.5						
35	35.0	0.1	SS-8	50/4 (50/4")	Limestone Fragments 35.0-35.1' - moderate yellowish brown, (10YR 5/4), fragments up to 1"x1/4", very poor recovery		Driller's Remark: Rock pieces are falling into hole at approximately 12-13', can't get bit back in hole; Installed 17' of 6" casing. Driller's Remark: 35'-35.5' is very hard Driller's Remark: 35.5'-40.0' drills similar to 20-35'
5.7	35.3						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 3 OF 9
SOIL BORING 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
 DRILLING 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 bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
0.7	40.0	0.7	SS-9	44-50/6 (94/12")	Sandy Silt (ML) 40.0-40.7' - moderate yellowish brown, (10YR 5/4), wet, hard, low plasticity, mild to moderate HCl reaction, 25-30% sand-sized particles to 1/8", carbonate materials		
	41.0						
45	45.0						
-4.3	45.9	0.9	SS-10	42-50/5 (92/11")	Silt With Sand (ML) 45.0-45.9' - Same as 40.0-40.7' except 29% sand; trace black particles and streaks; trace green streaks		Driller's Remark: Chatter on and off from approximately 40' on, layers with chatter are thin, only a few inches thick
50	50.0						
-9.3	50.2	0.1	SS-11	50/2.5 (50/2.5")	Limestone Fragments 50.0-50.05' - pale yellowish brown, (10YR 6/2), mild to moderate HCl reaction, fragments to 1/2", poor recovery		
55	55.0						
-14.3	55.4	0.4	SS-12	50/5 (50/5")	Silt With Sand (ML) 55.0-55.4' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, mild to moderate HCl reaction, 10-15% sand-sized particles to 1/16", carbonate materials, trace black organic lenses		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 4 OF 9
SOIL BORING 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
 DRILLING 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 bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-19.3	60.0	0.0	SS-13	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						
-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, moderate to strong HCl reaction, 5-10% fine sand size particles, carbonate materials		Driller's Remark: 65.0'-70.0' drilled similar to 60.0'-65.0', more rock chips in cuttings
70	70.0						Driller's Remark: Bouncing on SPT, will switch to rock coring at 70.0'
-29.3	70.1	0.0	SS-15	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
75							
-34.3							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-29.3	70.0-70.5 R1-NQ 0.5 ft 0%		NR		No Recovery 70.0-70.5' Limestone 70.5-75.2' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, medium strong to strong (R3 to R4), small (up to 1/16") voids cover 30% of surface, many 1/4" to 1/2" cavities some with fossil casts, and a 1" elongated cavity at 92.5', small voids decrease to <5% at 72.5-73.0', trace organic fossil infills and increased fossil molds and casts at 73.0-73.9', extremely weak (R1) rock at 94.0-94.6'	R1: 1 minute	
75		65	3				
			3				
	R2-NQ 5 ft 94%		0				
			3				
			1				
-34.3	75.5		NR		No Recovery 75.2-75.5' Limestone 75.5-78.6' - Same as 70.5-75.2' except medium strong (R3), small (up to 1/16") voids cover 30% of surface at 75.5-77.2', increased cavities up to 1/4" (elongated) at 76.4-77.2', very weak (R1) between fractures at 77.1' and 77.2', weak (R2) at 77.2-78.6'	R2: 13 minutes	
			4				
			3				
	R3-NQ 5 ft 62%		4				
		23	NR		No Recovery 78.6-80.5'		
			4				
			NR			R3: 14 minutes	
80			NR				
-39.3	80.5		1		Limestone 80.5-85.0' - moderate yellowish brown to dark yellowish orange, (10YR 5/4 to 10YR 6/6), fine grained, moderate HCl reaction, medium strong to weak (R3 to R2), fossiliferous with 25% small voids and several fossil cavities (up to 1" long), trace 1/4" organic fragments and several organic laminations, weaker with depth	Fractures tend to occur at weaker (R2) sections that are friable	
			3				
	R4-NQ 5 ft 90%		>10				
		52	1				
			5				
			NR		No Recovery 85.0-85.5' Limestone 85.5-90.5' - Same as 80.5-85.0' except weak to medium strong (R2 to R3), fossiliferous voids cover 30% of surface (10% minimum, 40% maximum), occasional fine laminations	R4: 12 minutes	
85			2				
			2				
	R5-NQ 5 ft 100%		5				
		48	2				
			2				
90						SC-1 collected at 89.3-90.5'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION	
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	
-49.3	90.5		0		Limestone 90.5-91.7' - Same as 85.5-90.5' except moderate yellowish brown, (10YR 5/4), medium strong (R3), fossiliferous, many cavities up to 1/2" 91.7-92.1' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, strong (R4), increasing voids with depth from 5-15%, elongated cavities near 94.8', large 1"x1"x1/2" cavity at 95.1' No Recovery 92.1-94.6' Limestone 94.6-95.5' - Same as 91.7-92.1' 95.5-99.3' - Same as 94.6-95.5' except voids increasing to 20-25%, weak (R2) at 97.9-98.85' 99.3-100.1' - yellowish gray, (5Y 7/2), moderate HCl reaction, strong (R4), voids decreasing to 5-10%, transition from above is irregular with infilling of cavities, 1/2"x3/4" deep spiral fossil at 99.5' No Recovery 100.1-100.5' Limestone 100.5-104.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, strong (R4), 1/16" voids varying from 5-30%, few 1/2" elongated fossils, few cavities, mostly shallow and <1/2", trace organics laminations and inclusions No Recovery 104.0-105.5' Limestone 105.5-108.0' - Same as 100.5-104.0' except light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), 10-20% voids, fragmented at 105.5-106.2' No Recovery 108.0-110.5'	R5: 14 minutes		
	R6-NQ 5 ft 50%		3				Based on overlying and underlying rock in the rock crush zone; picked 91.7' as contact End of core from R6-NQ matches top of R7-NQ core, therefore core loss interpreted to be from middle of core run Core loss assumed to be from 92.1-94.6'	
			>10					
			28	NR				
95 -54.3	95.5		2				R6: 14 minutes	
	R7-NQ 5 ft 92%		0				R7: 14 minutes	
			0					
			42	>10				
				8				
100 -59.3	100.5		8				Water level at 2.3 below ground surface	
	R8-NQ 5 ft 70%		5				SC-2 collected at 103.25-103.95'	
			52	1				
				1				
				NR				
105 -64.3	105.5		>10			R8: 20 minutes		
	R9-NQ 5 ft 50%		0			R9: 19 minutes		
			33	0				
				NR				
110								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-69.3	110.5		0				
	R10-NQ 5 ft 100%	53	8	111.7, 111.9' - Fractures (2), 50 deg, rough, undulating, tight	Limestone 110.5-115.5' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, very weak to strong (R1 to R4), small (1/16") voids 10-20%, minimal cavities, strong (R4) rock at 110.5-113.0', medium strong (R3) rock 113.0-113.5', intermingled zones of very weak and weak (R1 and R2) rock at 113.5-115.2', medium strong to strong (R3 to R4) at 115.1-155.5', intermittent zones of solid core and rock fragments 112.25-115.5'	R10: 17 minutes	
8			112.25' - Fracture zone, horizontal, stepped, 1"-2" angular fragments				
3			113.1' - Fractures, vertical, rough, moderately open, bounded by similar horizontal fractures at 113.0' and 113.25'				
>10			113.5' - Fracture, vertical, rough, undulating, open, bounded at 113.1' by horizontal fracture				
115 -74.3	115.5		2	114.25, 114.6' - Fractures (2), 40 deg, rough, undulating, between fractures are columnar vertical fragments and fractures that are rough, undulating, tight to open	115.5-117.5' - Same as 110.5-115.5' except moderate yellowish brown, (10YR 5/4), medium strong to strong (R3 to R4), with intermittent core and fracture zones similar to 112.25-115.5' No Recovery 117.5-120.5'	Sand on outside of core from 115.5'-116.0', chatter started about 6-7 minutes into run	
	R11-NQ 5 ft 40%	14	>10	115.1-115.5' - Fracture zone, angular, columnar			
			NR	115.5-116.1' - Fracture, vertical, rough, undulating, half core intact, the other half multiple fragments 116.1' - Fracture, horizontal, rough, undulating, open 116.7' - Fracture, horizontal, rough, undulating to stepped, open 116.7-117.5' - Fracture zone, angular 1-3" fragments			
120 -79.3	120.5		>10	120.8' - Fracture or bedding plane, horizontal, planar, open, weathered with rounded face on lower side, less rounded on upper side	Limestone 120.5-120.8' - Same as 115.5-117.5' except moderate HCl reaction, medium strong to strong (R3 to R4), fine grained, slightly banded with beige and gray 120.8-121.3' - Same as 120.5-120.8' except mild HCl reaction, very weak (R1), end of weaker rock in fracture zone No Recovery 122.8-125.5'	R11: 12 minutes	
	R12-NQ 5 ft 46%	8	3	121.1-121.5' - Fracture zone, larger angular to subangular 1-2" fragments of both over-and underlying rock			
			>10	NR			121.5, 121.75, 122.15' - Fractures (3), horizontal and 10 deg, rough, undulating, open 121.6' - Fracture, 70-90 deg, rough, undulating, small vertical terminated by horizontal fracture and fracture zone 122.15-122.25, 122.5-122.8' - Fracture zone (2), 1/4" to 1" subangular to rounded fragments
125 -84.3	125.5		>10	122.25, 122.5' - Fractures (2), horizontal, rough, stepped	Limestone 125.5-125.8' - Same as 120.5-122.8' except light olive gray to moderate yellowish brown, (5Y 5/2, 10Y 5/4), mild to moderate HCl reaction, very weak to weak (R1 to R2), rounded 3/4" to 1-1/2" spherical fragments 125.8-126.9' - Same as 125.5-125.8' except very weak to weak (R1 to R2), intact core 126.9-127.8' - Same as 125.5-125.8' except very weak (R1), friable No Recovery 127.8-130.5'	SC-3 collected at 125.8-126.6'	
	R13-NQ 5 ft 46%	28	2	125.5-125.8' - Fracture zone, rounded 3/4" to 1-1/2" fragments			
			2	125.8' - Fracture, horizontal, rough, undulating			
			NR	126.9' - Fracture, 60 deg, rough, undulating 127.7' - Fracture, horizontal, rough, undulating			
130						R13: 19 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 8 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 ORIENTATION : Vertical
 WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-89.3	130.5						
	R14-NQ 5 ft 36%	0					
			>10	130.5' - Fracture, horizontal, rough, planar 130.65-131.25' - Fracture zone, subangular 1/2" to 1-1/2"		Limestone 130.5-130.65' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), fine voids cover less than 5% of surface, very abrupt transition to 30% voids at 130.6' followed by a fracture	
			>10	130.65' - Fracture, horizontal, rough, planar 131.25, 131.35, 131.40, 131.55, 131.65' - Fractures (5), planar fractures along bedding planes, open		130.65-131.25' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2), 10-30% voids, entirely fragmented, 10-30% voids	
135			NR	131.65-132.1' - Fracture zone, angular, broken along horizontal planes and small 1/4" to 3/4" fragments		131.25-132.3' - Same as 130.5-130.65' except strong (R4), <3% voids, horizontal planes visible (<1/16")	R14: 17 minutes
-94.3	135.5						
	R15-NQ 5 ft 48%	25					
			>10	135.5-136.25' - Fracture zone, numerous 3/4" to 2" fragments, subangular to subrounded, contains lithology transition at 136.1'		No Recovery 132.3-135.5' Limestone 135.5-136.1' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), moderate HCl reaction, weak (R2), 10% 1/16" voids, few 1/4" elongated cavities	
			1	136.7' - Fracture, 10 deg, smooth, stepped, fracture steps at cavity, tight		136.1-137.9' - light olive gray to yellowish gray, (5Y 6/1 to 5Y 7/2), fine grained, moderate to strong HCl reaction, grayer transitioning to yellow with depth, 5% fine voids, several 1/4" to 1/2" elongated and deep (3/4") cavities. Cavities infilled in places with porous appearance, moderately HCl reaction	R15: 22 minutes
140			NR	137.6' - Fracture, 0-45 deg, stepped, tight		140.5-141.2' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl reaction, 1/16" voids over 5% of surface, 1/16" to 1/8" voids over 5% of surface, fracture zone with 1/4" to 1-1/2" fragments at 141.2'	Driller's Remark: Water level = 4.79' below ground surface Bit clogged, pulled casing, rocks in clay matrix, stopped at 143.0' to check bit (mechanical break)
-99.3	140.5						
	R16-NQ 5 ft 50%	10					
			<10	140.5-141.2' - Fracture zone, angular to subangular fragments 1/4" to 1-1/2"		No Recovery 137.9-140.5' Limestone 141.2-143.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), variations of 0-10% fine voids vary over interval	R16: 23 minutes
			2	141.3' - Fracture, 80 deg, smooth, undulating		No Recovery 143.0-145.5' Limestone 145.5-146.5' - Same as 141.2-143.0'	
			1	141.5' - Fracture, horizontal, rough, undulating, open		146.5-148.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium strong to strong (R3 to R4), up to 20% 1/16" voids, few 1/4" thin elongated fossils, red iron staining embedded and in fractures	Retrieved core from barrel when rods pulled (1.5' of core)
			NR	141.7' - Fracture, 70 deg, rough to smooth, undulating, may join with 80 deg fracture at 141.3'		No Recovery 148.0-150.5'	
			NR	142.1' - Mechanical break			R17: 18 minutes
145	145.5						
-104.3							
	R17-NQ 5 ft 50%	20					
			2	145.9' - Bedding plane, 10 deg, smooth, planar, open			
			5	146.3' - Fracture, horizontal, planar, open			
			1	146.4' - Fracture, 50 deg, planar			
			NR	146.5' - Fracture, horizontal, undulating, open			
			NR	146.8, 147.1' - Fractures (2), horizontal, rough, undulating, tight			
			NR	147.2, 147.4, 147.55' - Fractures (3), horizontal, rough, undulating, open			
150							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23	SHEET 9 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 ORIENTATION : Vertical
 WATER LEVELS : 2.3 ft bgs on 4/18/07 START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-109.3	150.5					Bottom of Boring at 150.5 ft bgs on 4/19/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23A	SHEET 1 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 ORIENTATION : Vertical
 WATER LEVELS : 5.0 ft bgs on 6/30/07 START : 11/28/2007 END : 11/28/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.4	0.0	1.1	SS-1	1-2-5 (7)	Topsoil (ML) 0.0-0.45' - grayish brown, (5YR 3/2), very loose, little organics, 0.3-0.45' wood and roots 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		Boring conducted for hammer testing purposes only; 2-7/8" drag bit
	1.5						
5 37.4	5.0	0.9	SS-2	5-8-12 (20)	Silty Sand (SM) 5.0-5.9' - moderate yellowish brown, (10YR 5/4), wet, medium dense, very fine to fine grained, no HCl reaction, 25% nonplastic fines, slight orange staining at 5.0-5.3', trace organics and black staining.		
	6.5						
10 32.4	10.0	1.1	SS-3	2-2-2 (4)	Silty Sand (SM) 10.0-10.75' - dark yellowish orange, (10YR 6/6), wet, very loose, very fine to fine grained, no HCl reaction, 25-30% nonplastic fines Sandy Silt (ML) 10.75-11.1' - moderate yellowish brown, (10YR 5/4), wet, nonplastic, rapid dilatancy, no HCl reaction, 40% fine silica sand		
	11.5						
15 27.4	15.0	1.0	SS-4	3-7-15 (22)	Silt (ML) 15.0-16.0' - dark yellowish orange, (10YR 6/6), wet, very stiff, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 5-10% very fine sand sized, carbonate material		Driller's Remark: Becomes harder-rocky at 14'
	16.5						
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 ORIENTATION : Vertical
 WATER LEVELS : 5.0 ft bgs on 6/30/07 START : 11/28/2007 END : 11/28/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.4	20.0	1.4	SS-5	12-42-50 (92)	Silt (ML) 20.0-21.35' - Same as 15.0-16.0' except hard		
	21.5						
25	25.0	0.9	SS-6	20-20-24 (44)	Sandy Silt And Limestone (ML) 25.0-25.9' - yellowish gray and dusky yellow, (5Y 7/2 and 5Y 6/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 35% fine to coarse sand sized, 10-15% fine gravel-sized limestone fragments, carbonate materials		Driller's Remark: Hard drilling from 26.5-30.0'
17.4	26.5						
30	30.0	1.1	SS-7	45-26-33 (59)	Sandy Silt And Limestone (ML) 30.0-31.05' - Same as 25.0-25.9 except dusky yellow, (5Y 6/4), moderate HCl reaction		Driller's Remark: Encountering rock at 33' and chattering
12.4	31.5						
35	35.0	0.7	SS-8	9-4-2 (6)	Silty Sand (SM) 35.0-35.65' - light olive gray, (5Y 2/2), wet, very loose, fine to coarse grained, moderate HCl reaction, 10% fine to gravel-sized limestone fragments, 20-25% nonplastic fines, carbonate materials		Driller's Remark: Hard at 37'; change to 2-7/8" tricone bit
7.4	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23A	SHEET 3 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 ORIENTATION : Vertical
 WATER LEVELS : 5.0 ft bgs on 6/30/07 START : 11/28/2007 END : 11/28/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.4	40.0	0.0	SS-9	50/1.5 (50/1.5")	No Recovery 40.0-40.1'		Driller's Remark: Medium hard drilling from 41-62'
45	45.0				No Recovery 45.0-46.0'		
-2.6	46.0	0.0	SS-10	46-50/5.5 (96/11.5")			
50	50.0						
-7.6	50.8	0.3	SS-11	33-50/3.5 (83/9.5")	Limestone Fragments 50.0-50.25' - light olive gray, (5Y 5/2), mild HCl reaction, fine gravel-sized fragments		
55	55.0						
-12.6	55.4	0.0	SS-12	50/5 (50/5")	No Recovery 55.0-55.4'		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-23A	SHEET 4 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 ORIENTATION : Vertical
 WATER LEVELS : 5.0 ft bgs on 6/30/07 START : 11/28/2007 END : 11/28/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.6	60.0	0.0	SS-13	50-50/4 (100/10")		Driller's Remark: Hard at 62' Driller's Remark: Soft from 62.5-64.5'
60.8						
65	65.0	0.0	SS-14	50/1 (50/1")		Driller's Remark: Hard from 64.5-66.5' Driller's Remark: Soft from 66.5-67.5' Driller's Remark: Hard from 67.5-70.0'
-22.6						
70	70.0	0.0	SS-15	50/1 (50/1")		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
-27.6						
75						
-32.6						
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-24	SHEET 1 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
 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
40.9	0.0	0.4	SS-1	0-4-4 (8)	Silty Sand With Organics (SM) 0.0-0.4' - grayish brown to dusky brown, (5YR 2/3 to 5Y 2/2), moist to wet, loose, fine sand, 16% fines, 12% organic matter	| | | | |	"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Begin drilling with 3-7/8" tri-cone bit at 2.0'
	1.5						
5 35.9	5.0	1.0	SS-2	2-3-4 (7)	Poorly Graded Sand With Silt (SP-SM) 5.0-5.95' - moderate yellowish brown, (10YR 5/4), wet, loose, very fine to fine grained, no HCl reaction, 11% low plasticity fines, trace roots, trace coarse gravel, sand is silica	| | | | |	
	6.5						
10 30.9	10.0	1.1	SS-3	4-5-10 (15)	Silt (ML) 10.0-11.05' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, trace fine grained sand, all carbonate derived	| | | | |	Driller's Remark: Surface around borehole sinking slightly
	11.5						
15 25.9	15.0	0.6	SS-4	47-50/3 (97/9")	Limestone Fragments And Silt (ML) 15.0-15.6' - silt is grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, 60% of sample is limestone, pale yellowish brown, (10YR 6/2), fine grained sand to coarse grained gravel-sized fragments, moderate HCl reaction	| | | | |	
	15.8						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
20.9	20.0	1.3	SS-5	13-47-18 (65)	Silt With Sand (ML) 21.0-21.25' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 6/2), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% sand-sized grains, 5-10% medium to coarse grained material		Driller's Remark: Harder drilling at 22.5'
	21.5						
25	25.0	1.5	SS-6	8-8-6 (14)	Sandy Silt (ML) 25.0-26.5' - Same as 20.0-21.25' except 27% fine grained sand, 13% medium to coarse grained sand		Driller's Remark: Hard drilling at 28', 20% circulation loss
15.9	26.5						
30	30.0	0.2	SS-7	50/2 (50/2")	Limestone Fragments 30.0-30.15' - light brown, (5YR 5/6), mild to moderate HCl reaction, moderately fossiliferous		4" casing set at 30'
10.9	30.2						
35	35.0	1.5	SS-8	6-10-19 (29)	Silty Sand (SM) 35.0-36.5' - dark yellowish brown, (10YR 4/2), moist to wet, medium dense, fine to coarse grained, mild HCl reaction, 30% nonplastic fines, all carbonate derived		
5.9	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-24	SHEET 3 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
 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.9	40.0	0.0	SS-9	50/3 (50/3")	No Recovery 40.0-40.3'		
45 -4.1	45.0 45.4	0.4	SS-10	50/5 (50/5")	Silty Sand (SM) 45.0-45.4' - moderate yellowish brown, (10YR 5/4), moist, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plasticity fines, 5% fine grained gravel		Driller's Remark: Hard to soft material from 45-50' (heavy to no grinding)
50 -9.1	50.0 51.5	1.5	SS-11	39-37-50 (87)	Limestone Fragments And Silty Sand (SM) 50.0-51.5' - Same as 45.0-45.6' except dark yellowish brown, (10YR 4/2), 60% limestone fragments, 40% silty sand		Driller's Remark: Medium grinding from 50-55'
55 -14.1	54.8	0.0	SS-12	50/1 (50/1")	No Recovery 55.0-55.1' Begin Rock Coring at 55.0 ft bgs See the next sheet for the rock core log		Advanced 4" casing to 55', switch to rock coring, see rock core log
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-14.1	55.0						
	R1-HQ 5 ft 82%	45	>10	55.1' - Fracture, horizontal, rough, planar, open	Limestone 55.0-57.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), medium grained, mild to moderate HCl reaction, weak (R2), voids (1/16-3/16") over 20-30% of surface, moderately fossiliferous (shell fragments), black organic lenses 3/16-3/8" at 55.6-55.9' and 56.8-57.0' Fat Clay (CH) 57.0-57.2' - moderate brown, (5YR 4/4), high plasticity Limestone 57.2-58.0' - Same as 55.0-57.0' Fat Clay (CH) 58.0-58.4' - grayish brown to dusky yellowish brown, (5YR 3/2 to 10YR 2/2), medium to high plasticity Limestone 58.4-59.1' - Same as 55.0-57.0' except cavities (3/16-9/16") over 40% of surface No Recovery 59.1-60.0' Limestone 60.0-61.2' - Same as 55.0-57.0' except pale yellowish brown, (10YR 6/2), medium to coarse grained 61.2-64.8' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), fine to coarse grained, moderate HCl reaction, very weak (R1), weak rock (R2) at 63.7', 63.8' and 64.0', friable, poorly fossiliferous No Recovery 64.8-65.0' Limestone 65.0-66.2' - Same as 61.2-64.8' except increase in weak rock (R2), rock chips 66.2-69.7' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, very weak to weak (R1 to R2), voids (up to 3/16") over 30% of surface, solution cavities (up to 3/4") over 10% of surface, intervals of fine grained limestone with no voids or solution cavities from 69.0-69.7' No Recovery 69.7-70.0' Limestone 70.0-72.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/8") over 5-10% of surface, silt-like matrix over 5% of surface, poorly fossiliferous Fat Clay (CH) 72.4-72.6' - light brown, (5YR 5/6), medium to high plasticity, no HCl reaction, with black, friable organics	R1: 11 minutes	
			0	55.4-55.6' - Fracture zone, multiple fractures, gravel-sized rock fragments			
			2	55.9' - Fracture or mechanical break, horizontal, rough, planar, tight			
			>10	57.0-57.2' - Clay seam, 0.2' thick			
			NR	57.9-58.4' - Fracture zone, multiple fractures			
60	60.0						
-19.1		R2-HQ 5 ft 96%	33	60.3' - Fracture or mechanical break, 60 deg		R2: 12 minutes	
			0	60.6' - Fracture, rough, stepped, open 1/8-5/16"			
			5	62.1, 62.5, 62.7, 62.8, 63.0, 63.3, 63.4, 63.7, 64.1, 64.4' - Fractures (10), rough, planar, <1/16" clay infilling			
			3				
			2				
			NR				
65	65.0						
-24.1		R3-HQ 5 ft 94%	38	65.0-66.2' - Fracture zone, rough to smooth, planar, <1/16" silt and/or clay sized infilling		SC-1 collected at 66.5-67.25'	
			>10				
			2	66.35, 66.5' - Fractures (2), rough, stepped, open 1/8"			
			1	67.2' - Fracture, rough, stepped, open 3/16-1/4"			
			2	68.5, 68.7' - Fractures (2), rough, stepped, open 1/16-3/16"			
			<10				
			NR				
70	70.0						
-29.1		R4-HQ 5 ft 76%	0	70.0-74.0' - Fracture zone, vertical, multiple fractures, mostly vertical along weak joints, slight infilling		R3: 9 minutes	
			10				
			10				
			10				
			10				
			NR				
75	75.0						
							R4: 8 minutes



PROJECT NUMBER: 338884.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
 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 : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-34.1	R5-HQ 5 ft 92%	72	0		Limestone 72.6-73.8' - moderate yellowish brown, (10YR 5/4), very weak (R1), voids (up to 1/16") over 10-20% of surface, moderately fossiliferous No Recovery 73.8-75.0' Limestone 75.0-79.6' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moderate HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 30-40% of surface, solution cavities at 76.4-77.3', highly fossiliferous No Recovery 79.6-80.0'	R5: 7 minutes	
			1	76.6' - Fracture, horizontal, rough, stepped, open 3/16-5/16", fracture along cavity			
			3	77.5-77.8' - Fractures, irregular fractures along solution cavities			
			2	78.6' - Fracture, 60 deg, rough, planar			
			1	79.6' - Fracture, horizontal, rough, stepped, open 1/16-1/8"			
80 -39.1	R6-HQ 5 ft 68%	37	NR		Limestone 80.0-83.4' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), weak to medium strong (R2 to R3), voids (1/16") over 20-30% of surface, solutions cavities (<3/4") over 10-15% of surface No Recovery 83.4-85.0'	R6: 7 minutes	
			2	80.5, 80.8' - Fractures (2), horizontal, rough, planar, some silt and sand infilling			
			>10	81.6, 82.0' - Fracture zone, multiple fractures along solution cavities			
			3	82.2' - Fracture or mechanical break, vertical 82.4' - Fracture, 3-5 deg, rough, stepped, trace infilling, open 1/8-1/4"			
			1	83.1' - Fracture, 15 deg, rough, planar			
85 -44.1	R7-HQ 5 ft 58%	35	NR		Limestone 85.0-87.3' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine grained, strong HCl reaction, weak (R2), trace voids, trace fossils, 20-30% silt sized matrix material 87.3-87.9' - Same as 85.0-87.3' except extremely weak to very weak (R0 to R1), silty matrix increases to 40-50% No Recovery 87.9-90.0'	Driller's Remark: 90% circulation loss at 88' R7: 8 minutes	
			4	85.0-85.2' - Fracture zone, irregular fractures along solution cavities 85.5' - Fracture, horizontal, smooth, undulating			
			1	86.2' - Fracture, horizontal, smooth, stepped, infilling			
			1	87.1, 87.4' - Mechanical break (2), horizontal, rough, planar 87.9' - Fracture, smooth, planar, irregular pieces			
90 -49.1	R8-HQ 5 ft 100%	52	2		Limestone 90.0-94.3' - grayish orange, (10YR 7/4), medium to coarse grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), voids (up to 1/8") over 20-30% of surface, moderately fossiliferous, silty matrix up to 40-50%	R8: 7 minutes	
			3	90.6' - Fracture, 7-10 deg, rough, planar 90.9' - Fracture, 0-1 deg, rough, planar 91.7, 91.8, 91.9' - Fractures (3), 2-4 deg, rough, planar			
			10	92.0-92.2' - Fractures or mechanical break, irregular fractures 92.4' - Fracture, horizontal, rough, planar, trace infilling			
			1	92.7' - Fracture, 40-50 deg, rough, planar, to undulating			
			10	93.9' - Fracture, 5-10 deg, rough, stepped, <3/16" infilling			
95	95.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-54.1	R9-HQ 5 ft 100%	78	1	94.3-95.0' - Fracture zone, multiple fractures, very soft material 95.2' - Fracture, horizontal, smooth, planar	Limestone 94.3-95.0' - Same as 90.0-94.3' except strong HCl reaction, silty matrix increases to 60-70% 95.0-100.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very weak (R1), voids (up to 1/16") over 10-20% of surface, solution cavities (up to 3/8") over 5-10% of surface, moderately fossiliferous, 5-10% silty matrix (chalk-like)	SC-2 collected at 95.2-96.4'	
			2	96.4, 96.85' - Fractures (2), 1 deg, rough, stepped, open 1/8-5/16"			
			3	97.2, 97.8, 97.9, 98.0, 98.15, 98.9' - Fractures (6), rough, stepped, open 3/16"			
			3				
			2	99.6, 99.7' - Fractures (2), horizontal, smooth, planar			
100	R10-HQ 5 ft 28%	0	10	100.0-100.35' - Fracture zone, irregular pieces	100.0-101.4' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCl reaction, very weak (R1), voids (up to 1/16") over 5-10% of surface, poorly to moderately fossiliferous No Recovery 101.4-105.0'	R9: 6 minutes	
-59.1			1	101.0, 101.3' - Fractures (2), 60 deg, rough, planar, tight			
			NR				
105	R11-HQ 5 ft 100%	52	0		Limestone 105.0-108.5' - Same as 100.0-101.4' except pale yellowish brown, (10YR 6/2) 108.5-110.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, extremely weak (R0), poorly fossiliferous, no voids	R10: 4 minutes	
-64.1			1	106.75, 107.2' - Fractures (2), horizontal, smooth, planar, tight			
			4	107.4, 107.7, 107.9' - Fractures (3), horizontal, rough, planar, open			
			10	108.3-108.7' - Fracture zone, irregular breaks along weak fractures			
			3	109.3, 109.5, 109.9' - Fractures (3), rough, stepped, open 1/8-3/16"			
110	R12-HQ 5 ft 78%	23	4	110.1, 110.2, 110.3' - Fractures (3), smooth, breaks along smooth fractures	Limestone 110.0-113.9' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak (R1), voids (up to 3/16") over 30-40% of surface, trace solution cavities (up to 3/8"), 10-20% silty and sandy sized matrix No Recovery 113.9-115.0'	R11: 5 minutes	
-69.1			4	110.8' - Fracture, rough, undulating			
			4	111.1, 111.6' - Fractures (2), rough, planar			
			>10	111.9, 111.98' - Fractures (2), 5 deg, smooth, planar			
			>10	112.1-112.6' - Fracture zone, multiple irregular breaks, some gravel sized rock fragments			
	NR	NR	113.0-113.9' - Fracture zone, multiple irregular breaks along weak fractures	R12: 4 minutes			
115	115.0						



PROJECT NUMBER: 338884.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
 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 : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-74.1	R13-HQ 5 ft 100%	62	1	115.3' - Fracture, horizontal, rough, planar	Limestone 115.0-120.0' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak (R1), voids over 20-30% of surface, solution cavities (9/16") over 15-20% of surface from 116.5-118.0', silty laminations (pale yellowish brown) with no voids/cavities at 118.7' and 118.9'	SC-3 collected at 115.3-116.15'	
120			2	116.25' - Fracture, rough, stepped, open 1/16-1/8"			
			-79.1	1			116.45' - Fracture, rough, planar
				6			117.7' - Fracture, smooth, undulating
							118.1' - Fracture, horizontal, smooth, planar, open 1/16"
							118.6' - Fracture, 60 deg, rough, undulating
120	2	118.7-118.9' - Fracture zone, regular breaks along weak fractures	120.0-124.3' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 20-25% of surface, 10-15% silty matrix, silty laminations at 123.5-123.6', fine grained carbonate laminations (very pale orange [10YR 8/2], weak to medium strong [R2 to R3]) at 123.8' and 123.9'				
	-79.1	4		119.2, 119.4' - Fractures (2), irregular breaks			
		0		120.2, 120.3, 120.5, 120.8' - Fractures, smooth, stepped, open 1/8-3/16"			
		4		122.1, 122.2, 122.6, 122.95' - Fractures (4), horizontal, rough, stepped			
		4		123.1, 128.2, 123.35, 123.5' - Fractures (4), 0-1 deg, smooth, planar			
125	R14-HQ 5 ft 86%	58	0		No Recovery 124.3-125.0'	R13: 7 minutes	
			-84.1	NR			
				2			125.1' - Fracture, rough, undulating
				0			125.5' - Fracture, 2 deg, rough, planar
				0			126.6, 127.7' - Mechanical break (2)
				5			128.2, 128.3, 128.4, 128.6, 128.8, 129.0' - Fractures (6), smooth, planar, breaks along weak fractures
130	R15-HQ 5 ft 100%	70	2	129.1, 129.3' - Fractures (2), 0-2 deg, rough, planar	Limestone 125.0-130.0' - pale yellowish brown, (10YR 6/2), moderate to strong HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 15-20% of surface, solution cavities (up to 3/4") over 20-30% of surface at 125.0-126.7', moderately fossiliferous, fine grained at 128.8-129.5', 15-20% silty matrix	R14: 6 minutes	
			-89.1	4			130.0-132.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, very weak (R1), solution cavities (up to 9/16") over 5-10% of surface, moderately fossiliferous
				1			130.7, 130.8, 130.9, 130.95' - Fractures (4), smooth, planar, breaks along weak fractures
				0			131.3' - Fracture, rough, stepped, open 1/8-3/16"
				0			132.2, 132.4, 132.5, 134.6' - Mechanical break (4), irregular breaks
130	R16-HQ 5 ft 92%	70	0	132.5-134.6' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), fine grained, strong to moderate HCl reaction, medium strong to strong (R3 to R4), solution cavities (up to 3/4") over 5% of surface, moderately fossiliferous	R15: 6 minutes		
			-89.1	0			
				0			
135	135.0		NR			R16: 7 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-24	SHEET 8 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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-94.1	R17-HQ 5 ft 88%	47	4	135.1, 135.4, 135.7, 135.9' - Fractures (4), horizontal, rough, undulating, open, dark yellowish brown staining		No Recovery 134.5-135.0' Limestone 135.0-136.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate HCl reaction, weak (R2), voids (up to 3/16") over 10-20% of surface, cavities (up to 1-3/16"x3/8") over 15-25% of surface, some fossil casts/molds 136.0-136.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (R1), voids (up to 3/16") over 30-40% of surface, trace cavities (3/8"x3/16"), moderately fossiliferous 136.4-138.6' - pale yellowish brown interlaminated with moderate yellowish brown, (10YR 6/2 with 10YR 5/4), fine to medium grained, moderate HCl reaction, weak (R2), trace voids (up to 1/16"), trace fossils (casts/molds), laminated 138.6-139.4' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), some fossils No Recovery 139.4-140' Limestone 140.0-142.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 5-10% of surface, trace fossils 142.5-142.8' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 10-20% of surface, trace fossils 142.8-145.0' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids (up to 1/8") over 10% of surface, fossils (molds/casts) over 10% of surface 145.0-146.0' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, very weak (R1), voids (up to 1/8") over 30-35% of surface, laminated, 20% silty matrix, friable 146.0-149.4' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), solution cavities (up to 3/4") at 147.8-148.2', laminated	SC-4 collected at 137.75-138.6' R17: 9 minutes R18: 5 minutes R19: 5 minutes Total depth 150.0'	
			10	136.0-136.5' - Fracture zone, some gravel sized rock fragments				
			0	136.6' - Fracture zone or mechanical break, 60 deg, tight				
			0	137.2' - Fracture or mechanical break, 40 deg, smooth, planar, tight				
			0	137.6' - Fracture or mechanical break, rough, planar, tight				
			NR	138.6, 138.9' - Mechanical break (2), rough, stepped, open 3/16-5/16" 139.3, 139.8' - Mechanical break (2), rough, planar				
140 -99.1	R18-HQ 5 ft 100%	93	0					
			0					
			4	142.3, 142.35, 142.4, 142.5' - Fractures (4), horizontal, smooth, planar, breaks along weak fractures				
			0					
145 -104.1	R19-HQ 5 ft 88%	67	5	145.1, 145.3, 145.4, 145.5, 145.8' - Fractures (5), horizontal, rough, planar, open 3/16"				
			0					
			0					
			0					
			NR					
150 -109.1								



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-24
SHEET 9 OF 9	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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 : 1.61 ft bgs on 6/14/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION		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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
						<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> No Recovery 149.4-150.0' </div> Bottom of Boring at 150.0 ft bgs on 5/17/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 1 OF 9
SOIL BORING LOG		

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 START : 4/19/2007 END : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.5	0.0	1.1	SS-1	2-2-4 (6)		Limited space in header: 3-15/16" tri-cone bit Soils logged by D. Roraback and J. Schaeffer Note: D50 S/N 240 (with cathead) started boring; due to mechanical issues, rig swapped to CME-55 S/N 299205 at 60 feet below ground surface. Soils drilled with D50.
	1.5					
5 37.5	5.0	1.2	SS-2	2-3-4 (7)		
	6.5					
10 32.5	10.0	1.2	SS-3	4-4-5 (9)		
	11.5					
15 27.5	15.0	1.0	SS-4	6-6-5 (11)		
	16.5					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 2 OF 9
SOIL BORING LOG		

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 START : 4/19/2007 END : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
22.5	20.0	1.1	SS-5	2-5-5 (10)	Clayey Sand (SC) 20.0-21.1' - yellowish gray, (5YR 8/1), moist, stiff, high plasticity, no dilatancy, no HCl reaction, 68% fine silica sand		
	21.5						
25	25.0	1.0	SS-6	5-5-5 (10)	Silty Sand (SM) 25.0-26.0' - pale yellowish brown, (10YR 6/4), wet, loose, very fine to fine grained, no HCl reaction, silica sand, 20% low to medium plasticity fines		
17.5	26.5						
30	30.0	0.7	SS-7	3-3-4 (7)	Clayey Sand (SC) 30.0-30.7' - pale yellowish brown, (10YR 6/2), wet, loose, very fine to fine grained, no HCl reaction, silica sand, 25-30% medium to high plastic fines, clay lenses throughout		
12.5	31.5						
35	35.0	1.4	SS-8	22-44-41 (85)	Sandy Silt (ML) 35.0-36.4' - light olive gray, (5Y 5/2), wet, very hard, nonplastic to low plasticity, rapid dilatancy, mild to moderate HCl reaction, 20-35% very fine to coarse sand-sized particles, carbonate materials		
7.5	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 3 OF 9
SOIL BORING LOG		

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 START : 4/19/2007 END : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.5	40.0	1.0	SS-9	17-47-43 (90)		Driller's Remark: Hitting hard material
	41.5					
45	45.0	0.0	SS-10	50/0.5 (50/0.5")		Driller's Remark: 45.5-46' softer
-2.5						
50	49.9	0.0	SS-11	50/0.5 (50/0.5")		Driller's Remark: 45.5-46' softer
-7.5						
55						
-12.5						
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 4 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-7.5	50.0						No Recovery 50.0-55.0'	Rock core logged by D. Roraback and P. De Sa'Rego Driller's Remark: Possible sand layer; tagged bottom at 55' below ground surface R1: 16 minutes
55 -12.5	55.0						Limestone 55.0-59.75' - pale yellowish brown, (10YR 6/4), fine to medium grained, mild delayed HCl reaction, extremely weak to very weak (R0 to R1), variable 10-20% voids to 1/16", trace casts/cavities up to 3/8"x3/8" throughout run, 30-40% cavities at 56.0-56.15'	R2: 11 minutes
60 -17.5	60.0						No Recovery 59.75-60.0' Limestone 60.0-62.6' - yellowish gray, (5Y 7/2), fine to medium grained, mild delayed HCl reaction, weak (R2), 15-20% voids up to 1/16", trace voids up to 1-3/16" by 3/8", thread-like black mottling up to 1-9/16" by 1/32" at 62.4'-62.8' No Recovery 62.6-65.0'	Rig switched out partway through boring due to mechanical issues -- change to CME 55 rig SN 299705 at 60' Driller's Remark: Water level at 2.3' below ground surface SC-1 collected at 60.15-61.20'
65 -22.5	65.0						Limestone 65.0-68.9' - moderate yellowish brown, (10 YR 5/4), mild delayed HCl reaction, weak (R2), 25-30% voids up to 3/16", no visible cavities except 67.75-67.95': large 3-1/8" by 2" infilled with medium gray (N5), medium strong (R3) fine grained carbonate No Recovery 68.9-70.0'	R3: 5 minutes R4: 4 minutes
70	70.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 5 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-27.5	R5-NQ 5 ft 86%	50	2	70.35' - Fracture, horizontal, rough, undulating, open 70.95' - Mechanical break	[Symbolic Log]	Limestone 70.0-72.5' - Same as 65.0-68.9' except black (organic) 1/8" thick irregular laminae at 72.3' and moderately fossiliferous at 72.35-72.5' 72.5-74.3' - pale yellowish brown mottled with dark yellowish brown, (10YR 6/2 and 10YR 4/2), fine to medium grained, mild delayed HCl reaction, weak (R2), 10% voids up to 1/16", trace cavities to 3/4" x 3/8", trace black (organic) thread-like mottles at 73.6' No Recovery 74.3-75.0'	R5: 8 minutes
0							
3			72.35, 72.5' - Fractures (2), horizontal, rough, undulating, open 72.8, 73.0-73.05' - Fractures (2), 30 deg, rough, undulating, open 73.4' - Fracture, <10 deg, rough, undulating, open				
3			73.6' - Mechanical break 74.2' - Fracture, horizontal, rough, undulating, open				
1							
75	R6-NQ 5 ft 100%	69	NR		[Symbolic Log]	Limestone 75.0-76.9' - Same as 72.5-74.3' except very weak to weak (R1 to R2), 80% dark yellowish brown mottled from 75.6-76.15' 76.4-76.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), 15-20% voids up to 3/16", no visible casts/cavities 76.9-78.7' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), no visible voids, 10% casts/cavities up 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' 80.0-83.05' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 15% voids up to 3/16", 10% casts/cavities up to 1-3/16" by 3/4", poorly fossiliferous 83.05-83.6' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 8/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids to 1/16", 15-20% casts/cavities up to 1-9/16" x 3/4", infilled with material similar to 80.0-83.5' No Recovery 83.6-85.0'	R6: 12 minutes
2			75.1' - Fracture, horizontal, rough, undulating, open 75.25, 75.8' - Mechanical break (2) 75.6' - Fracture, horizontal, smooth, planar, open				
2			76.2, 76.45' - Fractures (2), horizontal, rough, undulating, open 76.7-77.5' - Fracture, 85 deg, rough, undulating, tight to open over depth 77.1-77.5' - Fracture, 85 deg, parallel to above				
1			77.5, 77.6' - Mechanical break (2) 77.6-77.7' - Fracture, vertical, rough, undulating, open				
1			77.75' - Fracture, vertical, rough, stepped 78.15' - Fracture, <10 deg, smooth, planar 79.75-79.8' - Fracture, 30 deg, rough, undulating, open				
2			80.6-80.7' - Fracture, 45 deg, rough, undulating, open 80.8-81.2' - Fracture, 60 deg, rough, undulating, open 82.5' - Mechanical break				
80	R7-NQ 5 ft 72%	40	<10	82.95-83.15' - Fracture zone 83.3-83.6' - Fracture, 60 deg, rough, undulating, open 83.5-83.6' - Fracture zone	[Symbolic Log]	83.05-83.6' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 8/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids to 1/16", 15-20% casts/cavities up to 1-9/16" x 3/4", infilled with material similar to 80.0-83.5' No Recovery 83.6-85.0'	R7: 8 minutes
2			85.2, 85.25, 87.0' - Mechanical break (3) 85.45-85.5' - Fracture, 30 deg, rough, undulating, open 85.7-85.85' - Fracture, 60 deg, rough, undulating, open				
1			86.35' - Fracture, horizontal, rough, undulating, open 86.6' - Mechanical break				
2			87.2-87.5' - Fracture, 60 deg, rough, undulating				
1			87.75-87.8' - Fracture, 30 deg, smooth, undulating, black (organic?) clay infill up to 1/16" thick, open				
NR							
85	R8-NQ 5 ft 75%	38	2		[Symbolic Log]	Limestone 85.0-87.4' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, extremely weak to very weak (R0 to R1), 10-15% voids up to 1/16", trace casts/cavities up to 3/8" x 9/16" at 85.5-85.7'	R8: 9 minutes
2							
2							
1							
NR							
90	90.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 6 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-47.5	R9-NQ 5 ft 95%	72	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), and at 87.7-88.2' trace voids up to 1/16" No Recovery 88.75-90.0' Limestone 90.6-90.65' - Fracture or mechanical break, 30 deg, rough, undulating, open 91.1-91.2' - Fracture or mechanical break, 60 deg, rough, undulating, open 92.05-92.15' - Fracture, horizontal, rough, undulating, open 92.5' - Fracture, horizontal, rough, undulating, open 92.5-92.8' - Fracture, 75 deg, rough, undulating, open 92.65' - Fracture, horizontal, rough, undulating, open 93.0' - Mechanical break 93.7-94.2' - Fracture zone 94.2-94.3' - Fracture, 45 deg, rough, undulating, open 95.1-95.3' - Fracture, 60 deg, smooth, undulating 95.75' - Fracture, horizontal, rough, undulating, open 97.05' - Fracture, horizontal, rough, undulating, tight 97.5, 97.5-97.6, 97.6' - Mechanical break (3) 97.85' - Fracture, horizontal, rough, undulating, open 98.25' - Fracture, 5 deg, smooth, planar, open, 25% black staining on surface 98.4' - Fracture, horizontal, smooth, planar, open 98.6-98.7' - Fracture, 45 deg, rough, undulating, open 98.7-99.0' - Fracture zone 100.0-100.3' - Fracture zone 100.3' - Fracture, 10 deg, rough, undulating, open 100.55, 100.65' - Fractures (2 parallel), 20 deg, rough, undulating, open 100.55-100.65' - Fracture, 40 deg, rough, undulating, open, running between above fractures 100.65-100.9, 100.9-101.1, 101.1-101.3' - Fractures (3), 60 deg, rough, undulating, open, some fragments associated with fractures 101.3-101.4' - Fracture, 50 deg, rough, planar, open 101.55-101.7' - Fracture zone 102.0, 103.0' - Fractures (2), horizontal, rough, undulating, open 103.2-103.3' - Fracture, 45 deg, rough, undulating, open 103.65-103.75' - Fracture zone 105.35-105.85' - Fracture zone 105.85-105.95' - Mechanical break, vertical 105.85, 105.95, 106.1, 106.35' - Mechanical break (4) 106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R9: 9 minutes	
95			1	90.6-90.65' - Fracture or mechanical break, 30 deg, rough, undulating, open				
-52.5			4	91.1-91.2' - Fracture or mechanical break, 60 deg, rough, undulating, open				
95.0			>10	92.05-92.15' - Fracture, horizontal, rough, undulating, open				
-57.5			1	92.5' - Fracture, horizontal, rough, undulating, open				
100	R10-NQ 5 ft 80%	57	NR	93.0' - Mechanical break		95.0-97.3' - Same as 90.0-94.75' except pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4) 97.3-98.15' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), 10-15% voids up to 3/16", 10% cavities up to 9/16"x3/8", trace black pyrite infilling of cavities 98.15-99.0' - Same as 90.0-94.75' except no visible cavities No Recovery 99.0-100.0' Limestone 100.0-103.75' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), 10% voids up to 1/8", 10% casts/cavities up to 3/8"x3/4" at 100.36-100.65', 101.7-101.9', and 103.2-103.75' No Recovery 103.75-105.0'	R10: 12 minutes	
-57.5			2	93.7-94.2' - Fracture zone				
100.0			0	94.2-94.3' - Fracture, 45 deg, rough, undulating, open				
105			>10	95.1-95.3' - Fracture, 60 deg, smooth, undulating				
-62.5			5	95.75' - Fracture, horizontal, rough, undulating, open				
105.0	R11-NQ 5 ft 75%	20	NR	97.05' - Fracture, horizontal, rough, undulating, tight		105.0-109.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" throughout run, 25% casts/cavities up to 9/16"x3/8" at 105.0-105.2', trace casts/cavities, up to 9/16"x3/8" throughout entire run.	SC-2 collected at 102.0-103.0'	
105.0			>10	97.5, 97.5-97.6, 97.6' - Mechanical break (3)				
105.0			0	97.85' - Fracture, horizontal, rough, undulating, open				
105.0			7	98.25' - Fracture, 5 deg, smooth, planar, open, 25% black staining on surface				
105.0			NR	98.4' - Fracture, horizontal, smooth, planar, open				
105.0	R12-NQ 5 ft 90%	43	>10	98.6-98.7' - Fracture, 45 deg, rough, undulating, open		105.85, 105.95, 106.1, 106.35' - Mechanical break (4) 106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R11: 9 minutes	
105.0			>10	98.7-99.0' - Fracture zone				
105.0			4	100.0-100.3' - Fracture zone				
105.0			5	100.3' - Fracture, 10 deg, rough, undulating, open				
105.0			9	100.55, 100.65' - Fractures (2 parallel), 20 deg, rough, undulating, open				
105.0	R12-NQ 5 ft 90%	43	4	100.55-100.65' - Fracture, 40 deg, rough, undulating, open, running between above fractures		106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R12: 9 minutes	
105.0			5	100.65-100.9, 100.9-101.1, 101.1-101.3' - Fractures (3), 60 deg, rough, undulating, open, some fragments associated with fractures				
105.0			9	101.3-101.4' - Fracture, 50 deg, rough, planar, open				
105.0	R12-NQ 5 ft 90%	43	4	101.55-101.7' - Fracture zone		106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R12: 9 minutes	
105.0			5	102.0, 103.0' - Fractures (2), horizontal, rough, undulating, open				
105.0			9	103.2-103.3' - Fracture, 45 deg, rough, undulating, open				
105.0	R12-NQ 5 ft 90%	43	4	103.65-103.75' - Fracture zone		106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R12: 9 minutes	
105.0			5	105.35-105.85' - Fracture zone				
105.0			9	105.85-105.95' - Mechanical break, vertical				
105.0	R12-NQ 5 ft 90%	43	4	105.85, 105.95, 106.1, 106.35' - Mechanical break (4)		106.55' - Fracture, horizontal, rough, undulating, open No Recovery 109.5-110.0'	R12: 9 minutes	
105.0			4	106.55' - Fracture, horizontal, rough, undulating, open				
105.0			NR					
110	110.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 7 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-67.5	R13-NQ 5 ft 66%	50	>10	106.75' - Fracture or mechanical break, 40 deg, rough, undulating, open		Limestone 110.0-113.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1) from 110.0-110.5', weak (R2) from 110.5-113.5', 10% voids up to 1/16", trace casts/cavities up to 9/16"x2", trace thin dark organic inclusions (3/4" x 1-3/16") at 112.6' No Recovery 113.3-115.0'	R13: 6 minutes	
			3	107.5' - Mechanical break				
			2	107.6' - Fracture, horizontal, rough, undulating, open				
			2	107.6-108.05' - Fracture zone				
			NR	107.6-108.1' - Mechanical break, >80 deg, one face fractured as described above				
115	R14-NQ 5 ft 97%	58	1	108.25' - Mechanical break		Limestone 115.0-116.4' - Same as 110.0-113.3' except 10-15% voids up to 1/16", and no visible casts/cavities 116.4-117.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1), trace voids up to 1/16", no visible casts/cavities 117.7-118.4' - Same as 110.0-113.3' except very weak (R1) at 118.0-118.15' and trace voids up to 1/16", no visible casts/cavities throughout 118.4-118.95' - Same as 116.4-117.7' 118.95-119.85' - Same as 116.4-117.7' except very weak (R1) at 119.33-119.65' No Recovery 119.85-120.0' Limestone 120.0-122.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium (coarser with depth) grained, mild HCl reaction, medium strong (R3), trace voids to 1/16", trace casts/cavities to 3/8"x3/8" except at 120.5-120.7' and 121-121.7': with 15-20% casts/cavities, up to 2" x 3/4" x 3/4" "deep", partially infilled with recrystallized carbonate material moderate yellowish brown (10YR 5/4), weak, poorly fossiliferous, trace dark gray pyrite or organic material mottling at 121.9-122.0' No Recovery 122.4-125.0'	SC-3 collected at 116.4-117.5' R14: 7 minutes	
-72.5			1	108.8' - Fracture, 20 deg, smooth, undulating, open				
			1	108.8-109.2, 109.1-109.5' - Fractures (2), 70 deg, rough, undulating, open				
			1	109.05, 109.25' - Fractures (2), horizontal, rough, undulating, open				
			7	110.0-110.5' - Fracture zone				
			>10	111.1' - Fracture or mechanical break, horizontal, rough, undulating, open				
			NR	111.7-111.85, 111.95-112.05' - Mechanical break (2)				
120	R15-NQ 5 ft 48%	11	5	112.5' - Fracture, 10 deg, rough, undulating, open		120.0-122.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium (coarser with depth) grained, mild HCl reaction, medium strong (R3), trace voids to 1/16", trace casts/cavities to 3/8"x3/8" except at 120.5-120.7' and 121-121.7': with 15-20% casts/cavities, up to 2" x 3/4" x 3/4" "deep", partially infilled with recrystallized carbonate material moderate yellowish brown (10YR 5/4), weak, poorly fossiliferous, trace dark gray pyrite or organic material mottling at 121.9-122.0' No Recovery 122.4-125.0'	Driller's Remark: "Soft at 123.5 to 124 feet" R15: 11 minutes	
-77.5			>10	113.1' - Fractures (2 separated by 1/4"), 15 deg, rough, undulating, open				
			1	115.1-115.45' - Fracture, 75 deg, rough, undulating, open, trace black (pyrite) staining <1/16" thick on surface				
			NR	116.4' - Fracture, horizontal, smooth, undulating, open				
			5	117.75, 118.05' - Mechanical break (2)				
			>10	118.5, 118.6' - Fractures (2), horizontal, rough, undulating, open, some fragments				
125	R16-NQ 5 ft 76%	30	1	118.55, 118.65' - Mechanical break (2)		120.0-122.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium (coarser with depth) grained, mild HCl reaction, medium strong (R3), trace voids to 1/16", trace casts/cavities to 3/8"x3/8" except at 120.5-120.7' and 121-121.7': with 15-20% casts/cavities, up to 2" x 3/4" x 3/4" "deep", partially infilled with recrystallized carbonate material moderate yellowish brown (10YR 5/4), weak, poorly fossiliferous, trace dark gray pyrite or organic material mottling at 121.9-122.0' No Recovery 122.4-125.0'	R16: 13 minutes	
-82.5			>10	118.8, 118.95' - Fractures (2), horizontal, rough, undulating, open				
			2	119.35-119.65' - Fracture zone				
			4	120.4' - Mechanical break				
			3	120.6' - Fracture, horizontal, rough, undulating, open				
			NR	120.85-120.95' - Fracture zone, 4 fragments				
130			121.2-121.3' - Fracture zone					
			121.5' - Fracture, 5 deg, rough, undulating, open, associated with large cavity					
			121.7' - Fracture, horizontal, rough, undulating, open					
			121.9-122.4' - Fracture or mechanical break, 60 deg					
			125.0-125.3' - Fracture zone					
			125.4' - Mechanical break					
			125.65, 125.9' - Fractures (2), horizontal, rough, undulating, open					
			126.1-126.15' - Fracture, 25 deg, rough, undulating, tight					
			126.25-126.3' - Mechanical break, 25 deg, healed					
			127.225, 127.25, 127.5' - Fractures (3), horizontal, rough, undulating, open					
			127.6' - Fracture, horizontal, rough, planar, open to tight					
			127.85' - Fracture, horizontal, rough, planar, open					



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 8 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-87.5	R17-NQ 5 ft 61%	23	1	128.2' - Fracture, 20 deg, rough, undulating, open	|	Limestone 125.0-128.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), 20% voids <1/32", trace voids to 1/16", trace spherical casts 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', moderately fossiliferous, partial infilling (carbonate, very weak to weak, medium grained) with recrystallized material No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	SC-4 collected at 130.3-131.4'	
1			128.3-128.45' - Mechanical break, 45 deg, tight					
>10			128.45-128.5' - Mechanical break, 30 deg, tight					
1			130.3' - Fracture, horizontal, rough, undulating, open					
135	R18-NQ 5 ft 44%	7	NR	131.4' - Fracture, 25 deg, rough, undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R17: 11 minutes	
>10			131.7' - Fracture, horizontal, rough, undulating, open					
>10			131.95-132.05' - Fracture, 45 deg, rough, undulating, open, likely due to cavity					
NR			132.2, 132.4, 132.5' - Fractures (3), horizontal, rough, undulating, open					
140	R19-NQ 5 ft 76%	48	NR	132.5-132.7' - Fracture, vertical, rough, undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R18: 7 minutes	
1			132.6-132.65' - Fracture, 30 deg, rough, undulating, open					
1			132.9-133.05' - Fracture zone					
1			135.15-135.35' - Fracture zone					
140	R19-NQ 5 ft 76%	48	NR	135.45' - Fracture, horizontal, smooth, planar to undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R19: 14 minutes	
1			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					
1			136.7-136.8' - Fractured rock fragments (3), horizontal, rough, planar to undulating, open					
NR			140.8' - Fracture, <10 deg, rough, undulating, open					
145	R20-NQ 5 ft 82%	60	NR	141.6' - Fracture, horizontal, rough, undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R20: 17 minutes	
1			142.4-142.5' - Fracture zone					
1			142.65-142.75' - Fracture zone					
NR			143.6' - Fracture, 10 deg, rough, planar, open					
145	R20-NQ 5 ft 82%	60	2	145.45' - Fracture, horizontal, rough, undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R20: 17 minutes	
>10			145.7' - Mechanical break					
5			146.15-146.3' - Fracture zone, 50% dark brown staining on surfaces					
1			146.95' - Mechanical break					
150	R20-NQ 5 ft 82%	60	1	147.5-147.6' - Fracture, 70 deg, rough, undulating, open	|	No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR 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 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 136.4-136.45' No Recovery 137.2-140.0' Limestone 140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, mild HCl 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", partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35' 141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3) 141.6-142.4' - Same as 140.0-141.3'	R20: 17 minutes	
NR			148.2-149.1' - Mechanical break, 80 deg					
150	R20-NQ 5 ft 82%	60	NR	149.1-150.0' - Mechanical break	|			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25	SHEET 9 OF 9
ROCK CORE LOG		

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 : 4/23/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					142.4-143.8' - very pale orange, (10YR 8/2), very fine grained, mild HCl 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 HCl 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 HCl 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 HCl 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 EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 11/27/08 START : 11/27/2007 END : 11/27/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)						
	START	END					
42.2	0.0	1.5	SS-1	3-5-7 (12)	Limestone Fill 0.0-0.2' - dark yellowish orange, (10YR 6/6), strong HCl reaction 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'		2-7/8" tricone bit This boring is being drilled for hammer test purposes only.
5 37.2	5.0	6.5	SS-2	3-2-3 (5)	Lean Clay (CL) 5.0-5.1' - grayish black, (N2), wet, medium plasticity, no HCl reaction, trace very fine sand Silty Sand (SM) 5.1-5.4' - dark yellowish orange, (10YR 6/6), wet, loose, very fine to fine grained, 15% nonplastic fines, 5% fine organic particles		5.0-5.1' May be slough
10 32.2	10.0	11.5	SS-3	1-1-2 (3)	Fat Clay (CH) 10.0-10.1' - light greenish gray, (5G 8/1), moist to wet, soft, high plasticity, no dilatancy, no HCl reaction, 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 Fat Clay With Sand (CH) 10.3-10.95' - Same as 10.0-10.1' except 15% very fine silica sand		
15 27.2	15.0	16.5	SS-4	3-5-5 (10)	Fat Clay (CH) 15.0-15.3' - light greenish gray, (5G 8/1), wet, stiff, high plasticity, no dilatancy, trace fine to coarse sand that can be crushed, no HCl reaction with silty/clay matrix, strong HCl reaction for sand material Silty Sand (SM) 15.3-15.4' - light olive gray, (5Y 6/1), wet, loose, no HCl reaction, 20-25% low plastic fines Fat Clay (CH) 15.4-15.9' - Same as 15.0-15.3' Silty Sand (SM) 15.9-16.25' - Same as 15.3-15.4'		Changed to 2-7/8" drag bit Driller's Remark: Losing water while drilling
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 11/27/08 START : 11/27/2007 END : 11/27/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
22.2	20.0	1.1	SS-5	3-4-4 (8)	Fat Clay (CH) 20.0-20.4' - Same as 15.0-15.3' Silty Sand (SM) 20.4-20.7' - Same as 15.3-15.4' Fat Clay (CH) 20.7-21.1" - Same as 15.0-15.3' and 20.0-20.4'		Driller's Remark: Continue to lose circulation Fat clay and silty sand alternating from 10' (if not from 5')
25 17.2	25.0	1.3	SS-6	4-3-2 (5)	Fat Clay (CH) 25.0-25.3' - light greenish gray, (5G 8/1), wet, soft, high plasticity, no dilatancy, mild HCl reaction, trace 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 Clayey 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, 35% low to medium plastic fines		
30 12.2	30.0	1.5	SS-7	5-7-8 (15)	Fat Clay With Sand (CH) 30.0-30.4' - light greenish gray to light bluish gray, (6G 8/1 to 5B 7/1), moist, soft, medium plasticity, no HCl reaction, 20% very fine silica sand Silty Sand (SM) 30.4-31.5' - yellowish gray, (5Y 7/2), wet, medium dense, very fine grained, no HCl reaction, 25% nonplastic fines, irregular shaped lens of fat clay (CH) from 31.0-31.5'		
35 7.2	35.0	1.5	SS-8	5-4-4 (8)	Fat Clay (CH) 35.0-35.4' - Same as 30.0-30.4' Silty Sand (SM) 35.4-36.5' - Same as 30.4-31.0 except loose		Driller's Remark: Continuing to lose circulation/ water since 15-20' bgs (about 25 gallons per 5 foot run)
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-25A	SHEET 3 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 EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 11/27/08 START : 11/27/2007 END : 11/27/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
2.2	40.0	1.3	SS-9	4-2-4 (6)	Silt With Sand (ML) 40.0-40.4' - light olive gray, (5Y 5/2), moist, medium stiff, low plasticity, rapid dilatancy, no HCl reaction, 20% very fine silica sand	SS-9 has an organic rich appearance	
	41.5				Silt With Sand (ML) 40.4-41.3' - light olive gray transitioning to olive gray, (5Y 5/2 to 5Y 3/2), moist to wet, medium stiff, low to medium plasticity, 25% very fine silica sand, organic soil (OL/OH) seams 1/4" thick		
45	45.0					Driller's Remark: Rocky, chatter at 44'	
-2.8	45.4	0.4	SS-10	50/4.5 (50/4.5")	Silt (ML) 45.0-45.4' - dusky yellow, (5Y 6/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, trace limestone fragments up to 1/8", carbonate material	Driller's Remark: Changed back to tricone bit	
						For SS-10, 0.7' of soil in spoon; top 0.3' apparently slough. Material appears to be organic soil (OL), olive gray (5Y 3/2), wet, soft, low to medium plasticity, rapid dilatancy, no HCl reaction, 10% fine silica sand	
50	50.0					Driller's Remark: Firm drilling from 44-49', soft again from 49-50'	
-7.8	51.5	1.5	SS-11	15-25-36 (61)	Silty Sand And Limestone (SM) 50.0-51.5' - light olive gray, dusky yellow, and moderate olive brown, (5Y 5/2, 5Y 6/4, and 5Y 4/4), fine to coarse grained, mild HCl reaction, 20-30% low plastic fines (varies in sample), fine to coarse gravel-sized limestone fragments, carbonate materials Bottom of Boring at 51.5 ft bgs on 11/27/2007	For SS-11, 2.1' of soil in spoon; top 0.6' apparently slough	
						11/27/2007 at 17:00 water level = 4.5' bgs 11/28/2007 at 08:00 water level = 4.0' bgs	
55							
-12.8							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
42.4							Start drilling at 15:00 on 2/21/07 "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" 18" of topsoil at ground surface
5 37.4	5.0						
	0.5	SS-1	3-2-2 (4)	Poorly Graded Sand (SP) 5.0-5.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very loose, fine grained, no HCl reaction, silica sand, trace nonplastic fines, trace fine organics			SS-1 sampled at 15:10
	6.5						
10 32.4	10.0						
	1.4	SS-2	2-2-8 (10)	Silty Sand With Limestone Fragments (SM) 10.0-11.4' - yellowish gray, (5Y 8/1), wet, loose, fine to coarse grained, strong HCl reaction, 26% nonplastic to low plasticity fines, 15-20% gravel-sized fossiliferous limestone fragments, all carbonate			SS-2 sampled at 15:25
	11.5						
15 27.4	15.0						
	1.0	SS-3	17-19-5 (24)	Silty Sand With Limestone Fragments (SM) 15.0-16.0' - Same as 10.0-11.4'			
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 2 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.4	20.8 20.3	0.4	SS-4	50/6 (50/6")	Silt (ML) 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 17.4	25.0	1.4	SS-5	40-47-44 (91)	Silty Sand (SM) 25.0-26.4' - grayish orange, (10YR 7/4), moist to wet, very dense, fine to coarse grained, moderate HCl reaction, all carbonate, 35-40% nonplastic fines		SS-5 sampled at 16:00
30 12.4	30.0	1.0	SS-6	47-50/6 (97/12")	Silt (ML) 30.0-31.0' - dark yellowish orange, (10YR 6/6), moist to wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 10-15% very fine grained sand-sized, carbonate materials		
35 7.4	35.0	1.3	SS-7	23-33-50 (83)	Sandy Silt (ML) 35.0-36.3' - moderate yellowish brown, (10YR 5/4), moist, hard, nonplastic, very rapid dilatancy, mild HCl reaction, 40% fine to medium grained sand-sized, carbonate materials		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 3 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
2.4	40.0 40.6	0.3	SS-8	46-50/1 (96/7")	Silty Sand And Limestone Fragments (SM) 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	|||||	SS-8 sampled at 16:41 Driller's Remark: Rig chatter at 43.0' Driller's Remark: Lost circulation at 43.0'
45 -2.6	45.0 45.9	0.7	SS-9	36-50/5 (86/11")	Sandy Silt (ML) 45.0-45.7' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, all carbonate, 35-40% fine to medium sand-sized	|||||	SS-9 sampled at 17:05
50 -7.6	50.0 50.3	0.3	SS-10	50/4 (50/4")	Sandy Silt (ML) 50.0-50.25' - Same as 45.0-45.7'	|||||	SS-10 sampled at 17:30
55 -12.6	55.0 55.3	0.1	SS-11	50/4 (50/4")	Limestone Fragments 55.0-55.1' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), mild HCl reaction, fossiliferous	|||||	
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 4 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
-17.6	60.4	0.3	SS-12	50/5 (50/5")	Silty Sand (SM) 60.0-60.3' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild HCl reaction, 20% nonplastic fines, 15% organics, all carbonate except organics	|||||	SS-12 sampled at 08:00 on 2/22/07
65 -22.6	65.0	1.5	SS-13	15-29-47 (76)	Sandy Silt (ML) 65.0-66.5' - Same as 45.0-45.7'	|||||	SS-13 sampled at 08:20
	66.5						
70 -27.6	70.0	1.0	SS-14	19-50/6 (69/12")	Silt With Sand (ML) 70.0-71.0' - Same as 65.0-66.5' except mild to moderate HCl reaction, 20% fine to medium sand-sized	|||||	
	71.0						
75 -32.6	75.0	0.0	SS-15	50/1 (50/1")	Limestone Fragments 75.0-75.1' - few limestone fragments recovered, mild HCl reaction Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log	|||||	SS-15 sampled at 08:50 Switch to rock coring at 75.0'
	75.1						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 5 OF 9
ROCK CORE 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
 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 : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-32.6	75.0 R1-NQ 1.5 ft 73%	73	0		Limestone 75.0-76.3' - dusky yellow, (5Y 6/4), very fine to fine grained, moderate to strong HCl 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'	
76.5			1 NR	76.15' - Fracture or bedding plane, horizontal, rough, undulating, open, loose		Driller's Remark: Soft drilling, possible unconsolidated material	
80 -37.6	R2-NQ 5 ft 0%	0	NR		No Recovery 81.5-86.5'	R2: Run time not recorded	
85 -42.6	R3-NQ 5 ft 0%	0	NR		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'	
90 -47.6			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					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: 338884.FL	BORING NUMBER: B-26	SHEET 6 OF 9
ROCK CORE 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

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 : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-52.6	R4-NQ 2 ft 85%	50	>10 NR	94.8, 94.9' - Fracture, 10 deg, rough, undulating, open 94.9-95.85' - Fracture zone, angular to subangular fragments	Limestone 94.5-94.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), no voids No Recovery 94.9-95.2' Limestone 95.2-96.5' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, weak to medium strong (R2 to R3), begins in fracture zone with many deep cavities, below 95.8' voids increase from 0% to 20%, cavities up to 1" at 95.2' 96.5-98.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), 15-20% fine voids (1/16"), few small (1/4") cavities/fossils 98.4-99.3' - moderate yellowish brown interbedded with yellowish gray, (10YR 5/4 with 5Y 7/2), moderate to strong HCl reaction, very weak to medium strong (R1 to R3) 99.3-99.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1) 99.5-101.2' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong (R4), voids (<1/16") 0-10% (intermittently), several 1/4"-1/2" cavities and spiral fossil molds No Recovery 101.2-101.5' Limestone 101.5-102.0' - Same as 99.5-101.2' except fragmented 102.0-103.3' - Same as 99.5-101.2' except medium strong (R3), core intact until 102.8', several 1/4"-1/2" cavities and molds 103.3-104.5' - Same as 99.5-101.2' except extremely weak to very weak (R0 to R1), friable No Recovery 104.5-106.5' Limestone 106.5-106.8' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), fine (1/16") voids over 10-25% (variably), many 1/4" elongated cavities 106.8-107.3' - Same as 106.5-106.8' except extremely weak to very weak (R0 to R1), friable 107.3-109.25' - Same as 106.5-106.8' 109.25-109.7' - Same as 106.5-106.8' except very weak (R1)	Resume rock coring at 94.5' R4: 4 minutes	
96.5			1	96.5' - Mechanical break, 50 deg			Because of fracture surface at bottom end of core R4 matching top end of core R5, core loss for R4 is interpreted to be within fracture zone at 94.9'
			1	96.95' - Mechanical break			
			1	97.3' - Fracture, 65 deg, smooth, undulating, tight			
			1	98.15' - Fracture, 50 deg, rough, undulating			
	R5-NQ 5 ft 94%	24	3	98.8, 99.3, 99.8, 100.4, 100.7, 101.1' - Fractures (6), 60-80 deg, rough, undulating, significant fragmentation throughout, fragments 1/2"-3", elongate to angular			
100			2	99.4' - Fracture, horizontal, rough, stepped, open			
-57.6			2				
			NR				
			>10	101.5-102.0' - Fracture zone, subangular rock fragments 1/2"-2"			
			>10	102.35' - Fracture, 80 deg, smooth, undulating, terminates above at fracture zone			
			>10	102.8' - Fracture, 30 deg, smooth, undulating			
			>10	103.0-103.3' - Fractures (3), vertical, rough, undulating, fragmented			
	R6-NQ 5 ft 60%	7	>10	103.3-104.5' - Fracture zone, rock fragments from silt-size to 2", friable			
105			NR			R5: Run time not recorded	
-62.6							
			2	106.85' - Fracture, 55 deg, rough, stepped, open with small fragments			
			3	107.15, 107.7' - Fractures (2), 25 deg, rough, undulating, fragmented, particularly at 107.15'			
	R7-NQ 5 ft 89%	64	2	107.85, 107.95' - Fractures, 10 deg, rough, undulating, tight to open			
			2	108.75' - Fracture or mechanical break, 50 deg, healed			
			2	109.25' - Fracture, horizontal, rough, undulating to planar, open			
			1	109.7' - Fracture, 30 deg, smooth, undulating, tight with missing fragments			
			NR	109.95' - Fracture, 75 deg, rough, undulating, weathered, with slight infill			
			3	110.7' - Fracture, horizontal, rough, stepped to undulating			
			2	111.75' - Fracture, 80 deg, rough, stepped, second half of fracture is fragmented into angular 1"-2" pieces			
	R8-NQ 5 ft 100%	64	3	112.0' - Fracture, 50 deg, smooth, undulating			
				112.95' - Fracture, horizontal, rough, planar			
				113.15' - Fracture, 60 deg, smooth, stepped, tight, with weathered edges			
115						R6: 8 minutes	
						R7: 5 minutes	
						SC-1 collected 112.0-112.95'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 7 OF 9
ROCK CORE 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
 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 : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-72.6			1	113.7' - Fracture, horizontal, rough, planar, tight, with weathered edges		109.7-110.95' - Same as 106.5-106.8'	R8: 5 minutes
	116.5		3	113.9' - Fracture or mechanical break, 70 deg, rough, undulating, healed		No Recovery 110.95-111.5' Limestone	
			>10	114.35' - Fracture, horizontal, planar to slightly undulating		111.5-116.5' - dusky yellow to moderate yellowish brown, (5Y 6/4 to 10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 20% fine (1/16") voids, few cavities up to 1/4"	
			1	115.3' - Fracture, 70 deg, rough, undulating, 5/16" relief, terminates at a rough stepped fracture at 115.65', tight		116.5-116.7' - Same as 111.5-116.5' except medium strong (R3), with some weaker zones and rock fragments	
	R9-NQ 5 ft 72%	19	2	115.9' - Fracture, 70 deg, rough, undulating, tight, weathered		116.7-117.0' - Same as 111.5-116.5' except fragmented	
			1	116.45' - Fracture, horizontal, rough, undulating, 1/8" relief		117.0-119.2' - Same as 111.5-116.5' except medium strong (R3), with some weaker zones and rock fragments	
			NR	116.7-117.0' - Fracture zone, subrounded rock fragments 1/2"-2"		119.2-120.1' - Same as 111.5-116.5' except no to mild HCl reaction, very weak to weak (R1 to R2), sections of increased voids	
			NR	117.45' - Fracture, 10 deg, rough, undulating, tight, cuts across 80 deg fracture at 117.65'		No Recovery 120.1-121.5' Limestone	
			0	117.65' - Fracture, 80 deg, rough, undulating, 10 inches long, black staining (pyrite), tight, weathered		121.5-122.5' - dusky yellow to moderate yellowish brown, (5Y 6/4 to 10YR 5/4), fine grained, moderate to strong HCl reaction, medium strong (R3), small (1/16") voids over	
			>10	118.0' - Fracture, 25 deg, smooth, stepped, voids and molds on fracture surface		20-25%, fossiliferous (numerous molds/casts, small [1/4"] circular/oval voids, larger [1"] thin elongate cavities)	
			>10	118.97' - Fracture, 10 deg, rough, undulating, white crystalline infill, trace 1/16" voids on surface		122.5-122.85' - Same as 121.5-122.5' except very weak to weak (R1 to R2), secondary infilling of cavities, more friable	
	R10-NQ 5 ft 58%	19	NR	119.20' - Fracture, 10 deg, rough, stepped, open, friable, infilling, increased voids		122.85-123.7' - Same as 121.5-122.5' except 5% coverage of voids (1/16"), no fossils or cavities, elongate molds 1/16" wide, sharp angular breaks	
			NR	120.8' - Fracture, horizontal, rough, undulating	Silty Sand (SM)		
			NR	122.5' - Fracture, 15 deg, rough, undulating, tight but weathered and friable	123.7-124.15' - dark yellowish orange, (10YR 6/6), wet, fine grained, nonplastic, mild HCl reaction, 10% coarse sand-sized, 30% nonplastic fines, 10% fine gravel-size material, small fossil fragments, all calcareous material		
			NR	122.7' - Fracture, 25 deg, smooth, stepped, top of fracture zone	Limestone		
			>10	122.7-122.9' - Fracture zone, subangular 1" fragments	124.15-124.4' - Same as 122.85-123.7' except weak (R2)		
			>10	123.15, 123.4' - Fractures or bedding plane, 0-10 deg, rough, planar, tight, some fragmentation	No Recovery 124.4-126.5'		
			>10	123.25' - Fracture, 80 deg, rough, planar, tight, angular			
	R11-NQ 5 ft 78%	42	1	123.66' - Fracture, 20 deg, rough, undulating, top of unconsolidated zone			
			0	124.15' - Fracture, 10 deg, rough, undulating, bottom of unconsolidated zone			
			NR	124.25' - Fracture, 70 deg, rough, undulating			
			NR	126.8' - Fracture, 10 deg, rough, stepped, infilled			
			>10	126.8-127.9' - Fracture zone, no clear contacts, some vertical fractures at depth within zone			
			>10	127.9' - Fracture, horizontal, rough, undulating, open			
			>10	128.05' - Fractures (2), horizontal and 30 deg, rough, undulating, tight to open, fit together, weathered, slight infill			
	R12-NQ 5 ft 42%	8		128.50' - Fracture, 20 deg, rough, undulating			
				128.92' - Fracture, 10 deg, smooth, undulating			
				131.6-131.8' - Fracture zone, with angular fragments 1/2"-2" in size, bounded by rough and undulating horizontal fractures			
135							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 8 OF 9
ROCK CORE 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
 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 : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-92.6			NR	132.05, 132.2, 132.45' - Fractures (3), 0-10 deg, rough, undulating to stepped, open, increasing voids with depth		Limestone 126.5-126.8' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, weak (R2), 5-20% coverage of voids (1/16"), with infill of silty sand material similar to 123.7-124.15'	R12: 6 minutes	
136.5		>10	132.85' - Fracture, horizontal, rough, stepped to planar, open, cavity at break					
	R13-NQ 5 ft 62%	28	3	133.15' - Fracture, 10 deg, rough, undulating, soft, very weak rock material at fracture face, followed by rock fragments		126.8-130.4' - Same as 126.5-126.8' except weak to medium strong (R2 to R3), no infill No Recovery 130.4-131.5' Limestone	R13: Run time not recorded	
140		4	133.15-133.60' - Fracture zone, angular rock fragments 1/2"-2" with horizontal fractures within zone at 133.25' and 133.4'					
-97.6			NR	136.55, 136.6' - Fracture (2), horizontal, smooth, planar, along bedding planes		131.5-132.2' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, strong (R4), 20% fine (1/16") voids, elongate fossil molds 1/4"x1/2"	R14: 5 minutes	
141.5		3	136.8 137.05, 137.2, 137.35' - Fractures (4), 0-10 deg, smooth, planar, fragmentation between fractures, slight infill, some black staining					
	R14-NQ 5 ft 69%	25	3	137.6' - Fracture, horizontal, rough, undulating to stepped, open		132.2-132.9' - Same as 131.5-132.2' except 30% voids (up to 1/8"), more fossiliferous with larger cavities	R14: 5 minutes	
145		3	138.0, 138.4, 138.55' - Fractures (3), 20-40 deg, rough, undulating, tight to open with weathering at fractures					
-102.6			NR	139.1' - Fracture, 40 deg, rough, stepped, no matching face beneath		132.9-133.6' - Same as 131.5-132.2' except grading to light olive gray, (5Y 5/2), 0-15% voids No Recovery 133.6-136.5' Limestone	R14: 5 minutes	
146.5		6	139.1' - Fracture, horizontal, rough, planar					
	R15-NQ 5 ft 48%	9	4	139.6' - Mechanical break, 10 deg		136.5-137.6' - light olive gray grading to light olive brown with depth, (5Y 5/2 to 5Y 5/6), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), <5% voids, laminated bedding, white recrystallization infilling	R15: Run time not recorded	
150		2	141.85' - Fracture, horizontal, rough, stepped, open					
-107.6			NR	142.25' - Fracture, 10 deg, smooth, undulating, open, with color change starting at 141.95' and noticeable at 142.25'		137.6-139.1' - light olive gray to moderate yellowish brown, (5Y 5/2 to 10YR 5/4), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 5-25% voids (1/16"), horizontal bedding and 0-5% voids at 138.5-139.1', few cavities up to 1/2", some dark infilling	R15: Run time not recorded	
151.5		4	142.45' - Fracture or mechanical break, 40 deg, rough, planar, healed					
				142.6' - Fracture, smooth, undulating, open and weathered/rounded faces coated with lighter colored film of infill		139.1-139.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), 5-10% fine (1/16") voids, some organic infilling No Recovery 139.6-141.5' Limestone	End of Boring at 151.5' on 2/23/07	
		4	143' - Fracture, 20 deg, smooth, undulating, 3/4" cavity, weathered, subangular					
				143.5' - Fracture, 20 deg, rough, undulating, tight		141.5-141.95' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 10% fine (1/16") voids, several elongate (1/4"x1") cavities and 1/4" round cavities, light gray infilling of some cavities, 1/8" thick black laminations at top		
		4	143.55, 143.8, 143.95, 144.2, 144.4, 144.8' - Fractures (6), 0-25 deg, rough, undulating to stepped, less weathered and rounded than at 143.0', subangular fragments at all fractures, all open, some fragments between fractures					
				146.6' - Fracture, horizontal, rough, planar, staining on upper face only				
				146.7' - Fracture or mechanical break, vertical, smooth, planar, healed, terminates at fractures at 146.6' and 146.5'				
				146.8' - Fracture, horizontal, rough, stepped to planar, voids visible on fracture face				
				147.3, 147.6, 147.75, 148.3' - Fractures (4), 0-10 deg, rough, planar, tight with some minor fragmentation, angular breaks				
				147.7' - Fracture, 80 deg, rough, planar, terminated by fracture at 147.3', missing second half				
				148.45' - Fracture, 70 deg, rough, planar				
				148.6, 148.7' - Fractures (2), horizontal, undulating, open, weathered				



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-26	SHEET 9 OF 9
ROCK CORE 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
 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 : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					141.95-144.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, strong (R4), 5-15% fine (1/16") voids, many 1/4"-1/2" cavities, often infilled with weaker rock, increased voids and more resemblance to rock at 141.5-141.95' at 144.8-144.9' (possible start of transition sequence) No Recovery 144.95-146.5' Limestone 146.5-148.6' - repeated transitions from dusky yellow to light olive gray or light olive brown, (5Y 6/4 to 5Y 5/2 or 5Y 5/6), very fine to fine grained, moderate to strong HCl reaction, strong (R4), <3% voids (1/16") but with increased voids at 146.5-146.6' (5%), 148.1-148.2' (10%), and 148.6-148.9' (40%) 148.6-148.9' - Same as 141.5-141.95' except darker brown color, increased voids No Recovery 148.9-151.5' Bottom of Boring at 151.5 ft bgs on 2/23/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-27	SHEET 1 OF 9
SOIL BORING 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
 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 bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
42.4							"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels not recorded during drilling
5 37.4	4.5 6.0	1.0	SS-1	1-1-0 (1)	Poorly Graded Sand With Silt (SP-SM) 4.5-5.5' - moderate yellowish brown, (10YR 5/4), wet, very loose, very fine to fine grained, 10-15% nonplastic fines, silica sand, 10-12% organics		SS-1: Weight of hammer drove split spoon the last 6"
10 32.4	9.5 11.0	0.3	SS-2	0-0-0 (0)	Silty Sand (SM) 9.5-9.8' - very pale orange, (10YR 8/2), very wet, very soft, very fine to medium grained, strong HCl reaction, 30% low to medium plastic fines, silica and carbonate sands, 5-10% organics		SS-2: Weight of hammer drove split spoon 18", sample may be slough
15 27.4	14.5 16.0	1.0	SS-3	10-17-9 (26)	Silty Sand With Limestone Fragments (SM) 14.4-15.5' - white to yellowish gray, (N9 to 5GY 8/2), wet, medium dense, very strong HCl reaction, 40% fine to coarse gravel, 20% low to medium plastic fines, all carbonate materials		
20	19.5						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-27	SHEET 2 OF 9
SOIL BORING 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
 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 bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.4	0.8	SS-4	11-7-20 (27)	Silt (ML) 19.5-20.25' - very pale orange, (10YR 8/2), wet, very stiff, nonplastic, very rapid dilatancy, moderate HCl reaction, 5-10% very fine to fine grained sand		
21.0						
24.5						
25	0.8	SS-5	39-18-14 (32)	Silt With Sand And Limestone Fragments (ML) 24.5-25.3' - Same as 19.5-20.25' except 15% very fine to medium grained, 20% fine gravel-sized limestone fragments		
17.4						
26.0						
29.5						
30	1.3	SS-6	18-29-50/3 (79/9")	Silt With Sand (ML) 29.5-30.8' - Same as 24.5-25.3' except moderate yellowish brown, (10YR 5/4), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, trace fine gravel, 20-25% very fine to medium grained sand, all carbonate materials		
12.4						
30.8						
34.5						
35	1.1	SS-7	31-18-22 (40)	Silty Sand (SM) 34.5-35.6' - moderate olive brown, (5Y 4/4), wet, dense, very fine to coarse grained, mild HCl reaction, 10-15% fine gravel, 20-25% low plastic fines, all carbonate materials		
7.4						
36.0						
39.5						
40	0.1	SS-8	50/3			
39.8						



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-27	SHEET 3 OF 9
SOIL BORING 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
 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 bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
2.4			6"-6"-6" (N) (50/3")	Limestone Fragments 39.5-39.6' - light olive gray, (5Y 5/2), mild HCl reaction, poor recovery		
44.5						
44.6	0.0	SS-9	50/1 (50/1")	Limestone Fragments 44.5-44.6' - Same as 39.5-39.6' except poor recovery Begin Rock Coring at 44.0 ft bgs See the next sheet for the rock core log		Encountered rock from 37.0-46.0' switched to NQ coring Terminate soil sampling at 44.6' Set 35.0' NW casing
45 -2.6						
50 -7.6						
55 -12.6						
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
45 -2.6	R1-NQ 2 ft 85%	45	2	44.1' - Fracture, 10 deg, smooth, undulating, open 44.2' - Fracture, 20 deg, smooth, undulating, open 45.1' - Fracture, 5 deg, smooth, undulating, sandy infilling, open	Limestone 44.0-45.1' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 50% of surface, trace voids to 3/16" Silt (ML) 45.1-45.7' - moderate olive brown, (5Y 4/4), wet, stiff, moderate HCl reaction, trace fine sand No Recovery 45.7-46.0'	R1: 13 minutes 18:06 End day 2/8/07 at 46.0'	
46.0			NR	46.25' - Fracture, 50 deg, rough, planar 46.5' - Fracture, 20 deg, rough, undulating	Limestone 46.0-46.5' - moderate olive brown, (5Y 4/4), fine grained, moderate to strong HCl reaction, weak (R2), voids <1/16" on 40% of surface, moderately fossiliferous (molds to 3/16") Silt (ML) 46.5-49.3' - Same as 45.1-45.7' except trace limestone fragments to 1/16" No Recovery 49.3-51.0'	R2: 7 minutes	
50 -7.6	R2-NQ 5 ft 66%	0	0	51.25' - Fracture, 5 deg, smooth, undulating 51.3' - Fracture, 15 deg, smooth, undulating 51.8' - Fracture, 10 deg, rough, undulating 52.0' - Fracture, 25 deg, smooth, undulating, tight			
51.0			NR	53.35, 53.8' - Mechanical break (2)		Section appears competent but breaks into sandy silt sized particles when pushed on with 2 fingers	
55 -12.6	R3-NQ 5 ft 97%	43	5		52.5-54.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 40% of surface, trace voids to 3/16" (fossils) on <5% of surface, trace organics Silt (ML) 54.7-55.85' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, trace limestone fragments to 1/16" No Recovery 55.85-56.0'	R3: 4 minutes	
56.0			>10	56.9, 57.3, 57.4' - Mechanical break			
60 -17.6	R4-NQ 5 ft 100%	46	1	58.75' - Fracture, 60 deg, rough, undulating, 1/8" clay infilling 59.1' - Fracture, horizontal, smooth, undulating, 1/8" clay infilling 59.1-59.5' - Fracture, 80 deg, rough, planar, open 59.3' - Fracture, 10 deg, smooth, undulating, open 59.5' - Fracture, 5 deg, smooth, undulating, open 59.6' - Fracture, 50 deg, rough, undulating, open 60.35' - Mechanical break 60.8' - Mechanical break 61.5' - Fracture, 10 deg, rough, undulating, 20% coverage clay infilling, tight	Limestone 56.0-56.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), 56.4-56.7' extremely weak (R0) zone 56.7-61.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 50% of surface in two zones from 58.2-61.0', trace voids to 3/8" are <5% of surface on 58.2-61.0', zones of very weak rock 57.3-57.8' and 58.8-59.3', moderately fossiliferous (molds) below 60.0'	R4: 5 minutes	
61.0			>10				
	R5-NQ 5 ft 88%	71	1				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 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 : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
65 -22.6	66.0	16	2	61.75, 62.0' - Mechanical break 62.3' - Fracture, 20 deg, smooth, undulating, 15% coverage clay infilling, open to 3/8"	Limestone 61.0-65.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium 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'	R5: 12 minutes	
			1	63.9' - Fracture, 5 deg, smooth, undulating, 10% coverage clay infilling, open			
	R6-NQ 5 ft 34%	16	NR	64.3' - Mechanical break 64.5' - Fracture, 40 deg, rough, undulating, tight	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 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'	R6: 12 minutes	
			4	64.7' - Fracture, 60 deg, rough, undulating, 10% coverage clay infilling, tight			
			2	65.2' - Fracture, 20 deg, smooth, planar, clay infilling 66.1' - Fracture, 10 deg, smooth, undulating, open			
			NR	66.5' - Fracture, 15 deg, smooth, undulating, open 66.65' - Fracture, 5 deg, smooth, undulating, open			
70 -27.6	71.0	29	2	66.8' - Fracture, 15 deg, smooth, undulating, open 67.2' - Fracture, 25 deg, smooth, undulating, open	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	
			>10	67.75' - Fracture, 10 deg, smooth, undulating, open 71.6' - Fracture, 20 deg, rough, undulating, 20% coverage clay infilling, open to 3/8"			
			>10	72.1' - Fracture, 15 deg, rough, undulating, open 72.1-73.3' - Fracture zone, horizontal and vertical, rough, undulating, open, fragments from 3/8" to 4"			
75 -32.6	76.0	48	NR	73.3' - Fracture, 30 deg, rough, undulating, open 73.75' - Fracture, 10 deg, rough, undulating, tight to open up to 9/16"	Limestone 76.0-79.8' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained, moderate HCl 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	
			>10	74.1' - Fracture, 30 deg, rough, undulating, open 76.0-76.6' - Fracture zone, rough, undulating, fragments 3/16" to 1-1/2"			
	R8-NQ 5 ft 76%	48	1	76.8' - Fracture, 10 deg, rough, undulating, 30% coverage clay infilling, open	Limestone 81.0-85.4' - moderate yellowish 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	SC-1 collected at 81.0-82.0'	
			1	77.1' - Fracture, 30 deg, rough, undulating, 30% coverage clay infilling, open			
			0	78.5' - Fracture, 10 deg, rough, undulating, 20-25% coverage clay infilling			
80 -37.6	81.0	40	NR				
			0	82.4' - Mechanical break			
	R9-NQ 5 ft 88%	40	1				
			4	83.25' - Fracture, 60 deg, rough, planar, tight to open up to 3/16"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-27	SHEET 6 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -42.6	86.0 R10-NQ 5 ft 94%	50	4	83.4' - Fracture, 20 deg, smooth, undulating, tight	[Symbolic Log]	No Recovery 85.4-86.0' Limestone 86.0-86.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids <1/16", laminated subhorizontal bedding from 86.0-86.4' 86.8-87.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 20% of surface 87.0-90.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), zone of weak (R2) rock from 87.5-88.5', voids <1/16" on 25% of surface, trace voids to 3/16"x3/8", moderately fossiliferous No Recovery 90.7-91.0' Limestone 91.0-93.5' - Same as 87.0-90.7' No Recovery 93.5-96.0'	R9: Run time not recorded
			2	83.65' - Fracture, 30 deg, rough, undulating, open			
			NR	83.8' - Fracture, 20 deg, rough, undulating, open			
			>10	84.0' - Fracture, 70 deg, rough, planar, tight			
			>10	84.1' - Fracture, 10 deg, rough, undulating, open			
			>10	84.5' - Fracture, 10 deg, rough, undulating, tight to open up to 3/16"			
			>10	84.75' - Fracture, 50 deg, rough, undulating, open			
			0	85.0' - Fracture, 50 deg, rough, planar, tight			
			>10	85.3' - Fracture, 50 deg, smooth, planar, open			
			0	86.65' - Fracture, 20 deg, rough, undulating, open			
90 -47.6	91.0 R11-NQ 5 ft 50%	27	>10	86.85-87.05, 87.4-87.5, 88.0-88.3, 90.4-90.7' - Fracture zone (4), rough, undulating, fine gravel sized limestone fragments	[Symbolic Log]	No Recovery 90.7-91.0' Limestone 91.0-93.5' - Same as 87.0-90.7' No Recovery 93.5-96.0'	R10: Run time not recorded
			NR	87.05-87.5' - Fracture (2), 45 deg and 80 deg, rough, undulating, open, tight-open respectively			
			>10	91.0-92.2' - Fracture zone, 0-75 deg, rough, undulating, fragments 1/2"-2", trace bi-directional drill marks			
			1	92.4, 92.6' - Mechanical break (2)			
			0				
			NR				
			>10	96.0-96.3' - limestone fragments gravel to cobble sized			
			3	96.4' - Fracture, 10 deg, rough, undulating, open			
			2	96.7' - Fracture, 15 deg, rough, undulating, open			
			0	97.0' - Fracture, 25 deg, rough, undulating, open			
95 -52.6	96.0 R12-NQ 5 ft 66%	34	NR	97.5' - Fracture, 10 deg, smooth, undulating, open	[Symbolic Log]	No Recovery 93.5-96.0' Limestone 96.0-99.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 40% of surface, voids to 3/16" on 5% of surface, cavities to 3/8"x3/4" from 96.0-97.3', moderately fossiliferous (casts, molds) No Recovery 99.3-101.0'	R11: Run time not recorded
			NR	97.6' - Fracture, 50 deg, smooth, planar, tight			
			NR	98.0' - Fracture, 15 deg, rough, undulating, open			
			NR	98.2' - Fracture, 20 deg, rough, undulating, open			
			NR	99.3' - Fracture, 40 deg, smooth, planar			
			3	101.05' - Fracture, 40 deg, smooth, undulating, tight			
			2	101.3' - Fracture, 40 deg, smooth, planar, charcoal gray staining, tight			
			1	101.8' - Fracture, 35 deg, rough, undulating, open			
			NR	102.4, 102.65' - Fracture (2), 40 deg, rough, undulating, tight			
			NR	103.0' - Mechanical break			
100 -57.6	101.0 R13-NQ 5 ft 100%	68	3	101.05' - Fracture, 40 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 101.0-104.5' - Same as 96.0-99.3' except weak (R2)	R12: Run time not recorded
			2	101.3' - Fracture, 40 deg, smooth, planar, charcoal gray staining, tight			
			1	101.8' - Fracture, 35 deg, rough, undulating, open			
	NR	NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.6	R14-NQ 5 ft 60%	24	4	103.5' - Fracture, 30 deg, rough, undulating, yellowish brown staining on 20% of surface, tight	Limestone 104.5-106.0' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16" on 15% of surface, trace fossil molds and casts to 3/16" 106.0-107.3' - Same as 104.5-106.0'	SC-2 collected at 104.5-105.45' R13: 10 minutes	
			2	103.6-103.9' - Fracture, 60 deg, rough, undulating, tight			
			>10	104.1' - Fracture, 25 deg, rough, undulating, charcoal gray staining, open to 3/16"			
			6	104.15' - Fracture, 60 deg, rough, planar, open to 1/16"			
			>10	104.4' - Fracture, 15 deg, rough, undulating, charcoal gray staining, open to 3/8"			
			NR	104.5' - Fracture, 50 deg, rough, planar, charcoal gray staining, tight			
			NR	105.45, 105.7' - Fracture (2), 70 deg, rough, planar, charcoal gray staining, open			
			NR	106.15' - Fracture, 50 deg, rough, planar, charcoal gray staining			
			NR	106.15-106.5' - Fracture, 30 deg, rough, undulating, tight			
			NR	106.15-106.5' - limestone fragments 2"x2"			
110 -67.6	R15-NQ 5 ft 55%	45	1	107.0' - Fracture, 15 deg, rough, undulating, open	Limestone 111.0-111.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), voids <1/16" on 20% of surface, voids and fossil (casts, molds) to 3/8"x1" on 15% of surface, trace organics, at 111.3' clasts of gray limestone 1/4"x1"	R14: 7 minutes	
			1	107.2' - Fracture, 30 deg, rough, undulating, open			
			2	107.6' - Fracture, 30 deg, rough, undulating, open			
			NR	108.3-108.8' - limestone fragments from 3/16" to 1"x2"			
			NR	111.9' - Fracture, horizontal, rough, stepped			
			NR	113.0' - Fracture, 5 deg, smooth, undulating, brown staining, tight			
			NR	113.4-113.8' - Fracture zone, fragments to 1-1/2" subangular to subround			
			NR	116.1, 116.35, 116.85, 117.0, 117.1' - Fracture (5), horizontal and 5 deg, rough, undulating			
			NR	118.0-119.5' - Fracture zone or mechanical break (5)			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
115 -72.6	R16-NQ 5 ft 76%	42	5	107.0' - Fracture, 15 deg, rough, undulating, open	Limestone 111.0-113.75' - moderate olive brown with very pale orange and olive gray, (5Y 4/4 with 10YR 8/2 and 5Y 4/1), fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 15% of surface, fossil molds	R15: Run time not recorded	
			2	116.1, 116.35, 116.85, 117.0, 117.1' - Fracture (5), horizontal and 5 deg, rough, undulating			
			3	118.0-119.5' - Fracture zone or mechanical break (5)			
			2	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
120 -77.6	R17-NQ 5 ft 22%	0	>10	121.0-126.0' - recovery too low to accurately identify fracture depths	Limestone 121.0-122.1' - Same as 117.1-119.8' No Recovery 122.1-126.0'	R16: Run time not recorded Low recovery	
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			
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			NR	121.0-126.0' - recovery too low to accurately identify fracture depths			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -82.6			NR					R17: Run time not recorded
	126.0		2	126.0-126.5' - Fracture zone		Limestone 126.0-126.8' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, medium strong (R3), voids <1/16" over 10% of surface, trace voids to 3/16"		
		R18-NQ 5 ft 94%	32	126.8' - Fracture, horizontal, rough, stepped, tight 127.1' - Fracture, 5 deg, rough, undulating, open 127.4-127.9' - Fracture zone		126.8-127.7' - moderate yellowish brown, (10YR 5/4), fine grained, weak (R2), voids <1/16" over 20% of core, predominately oriented along laminated bedding planes, trace voids to 3/16"		Weaker rock at 129.0'
130 -87.6			2	129.4-130.2' - Fracture zone		127.7-130.7' - dusky yellow, (5Y 6/4), fine grained, mild HCl 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'		R18: Run time not recorded
	131.0		NR			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"		
		R19-NQ 5 ft 62%	26	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 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.7' - Fracture, 30 deg, rough, undulating 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1"		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		R19: Run time not recorded
135 -92.6			NR			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		
	136.0		2	136.5' - Fracture, horizontal, smooth, planar, tight		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), laminated bedding, at 136.8' and 137.2', 136.8-137.2' moderate yellowish brown (10YR 5/4), voids <1/16" over 20% of surface		SC-3 collected at 137.15-138.0'
		R20-NQ 5 ft 50%	16	136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone		138.0-138.5' - moderate olive brown, (5Y 4/4), fine grained, mild to moderate HCl reaction, weak (R2), trace voids <1/16" over <25% of surface		Driller's Remark: Soft material at 138.0'
140 -97.6			NR			No Recovery 138.5-141.0' Limestone 141.0-141.15' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak (R2), trace voids <1/16" over <25% of surface		R20: 46 minutes
	141.0		3	141.15' - Fracture, 5 deg, rough, undulating, open to 3/16"				
			2	141.5' - Fracture, 10 deg, rough, undulating, open to 1/4"				
		R21-NQ 5 ft 86%	60	141.9' - Fracture, 15 deg, rough, undulating, open 142.0' - Fracture, 10 deg, rough, undulating, open to 1/8"				



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-27	SHEET 9 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/8/2007 END : 2/10/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
145 -102.6	R22-NQ 4 ft 88%	56	5	142.55' - Fracture, 30 deg, smooth, planar, open to 3/16"	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 transitions to yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, moderate to mild HCl reaction, medium strong (R3), laminated 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 3/16", color changes to moderate yellowish brown (10YR 5/4) at 144.8' No Recovery 145.3-146.0' Limestone 146.0-148.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild to moderate HCl 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 HCl 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 HCl 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	R21: 20 minutes R22: 18 minutes	
146.0			2	143.3' - Fracture, 65 deg, rough, planar, 30% coverage brown staining, open to 3/16"			
			NR	143.7, 144.0' - Mechanical break			
150 -107.6			2	144.4' - Fracture, 5 deg, rough, planar, tight			
			1	144.6, 144.7' - Fracture, horizontal, rough, undulating, open			
			5	144.9, 144.95, 145.0' - Bedding plane, horizontal, smooth, planar, tight to open up to 1/8"			
			0	146.3' - Fracture, 75 deg, rough, undulating, tight to open up to 3/16", gray staining on 20% at surface			
			NR	146.5' - Fracture, 5 deg, rough, undulating, tight			
				147.1' - Fracture, 15 deg, rough, undulating, open			
				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"					



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-28	SHEET 1 OF 9
SOIL BORING 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
 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 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
41.5	0.0	1.5	SS-1	2-2-3 (5)	Top Soil 0-0.5' - roots Poorly Graded Sand (SP) 0.5-0.9' - yellowish gray, (5Y 7/2), moist to wet, loose, fine grained, no HCl reaction, trace nonplastic fines, trace 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		
36.5	1.5	6.5					
	5.0	6.5	SS-2	0-0-1 (1)	Silty Sand (SM) 5.0-6.2' - yellowish gray, (5Y 7/2), wet, very loose, fine grained, no HCl reaction, 25-30% nonplastic fines, trace roots		
10	10.0	11.5	SS-3	1-2-3 (5)	Silty Sand (SM) 10.0-10.7' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), wet, loose, fine grained, no HCl reaction, 15-20% nonplastic fines, 10% organics		Organic odor
15	15.0	16.5	SS-4	2-4-10 (14)	Silty Sand (SM) 15.0-15.35' - light olive gray, (5Y 5/2), wet, very loose, fine grained, mild HCl reaction, 25-30% low to medium plasticity fines Silt (ML) 15.35-15.55' - grayish orange, (10YR 7/4), wet, soft to medium stiff, fine grained, nonplastic, very rapid dilatancy, mild HCl 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 HCl reaction, 25% low to medium plasticity fines, two gravel-sized pieces up to 1"		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-28	SHEET 2 OF 9
SOIL BORING 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
 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 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)		7-9-8 (17)			
21.5	20.0	1.0	SS-5	7-9-8 (17)	Silt (ML) 20.0-21.0' - yellowish gray, (5Y 8/1), wet, very stiff, nonplastic, very rapid dilatancy, mild HCl reaction		
	21.5						
25	25.0	1.4	SS-6	10-15-15 (30)	Silt With Sand (ML) 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, 15-25% fine to medium sand-sized		
16.5	26.5						
30	30.0	1.0	SS-7	17-20-17 (37)	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-26.4' except moist to wet, hard, trace fine to coarse gravel-sized		
11.5	31.5						
35	35.0	0.3	SS-8	4-0-0 (0)	Sandy Silt (ML) 35.0-35.25' - moderate yellowish brown, (10YR 5/4), wet, very loose, mild HCl reaction, 40% fine to medium sand-sized, trace organics		
6.5	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-28	SHEET 3 OF 9
SOIL BORING 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
 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 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
1.5	40.4	0.4	SS-9	50/5 (50/5")	Silty Sand With Limestone Fragments (SM) 40.0-40.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very dense, mild to moderate HCl reaction, 28% fines, 20% limestone fragments in lenticular shapes		
45 -3.5	45.0	1.0	SS-10	23-30-17 (47)	Silt With Sand (ML) 45.0-46.0' - moderate yellowish brown, (10YR 5/4), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 10-15% fine sand-sized, 5-10% organics in <1/16" thick lenses		
50 -8.5	50.0	1.3	SS-11	13-24-50/5 (74/11")	Silt With Sand (ML) 50.0-51.3' - Same as 45.0-46.0' except 25% fine to medium sand-sized, trace organics		
55 -13.5	55.0	0.8	SS-12	32-50/3 (82/9")	Silt (ML) 55.0-55.8' - Same as 50.0-51.3' except 10-15% fine sand-sized, trace organics in thin threads and chunks		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-28	SHEET 4 OF 9
SOIL BORING 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
 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 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-18.5	60.0	0.3	SS-13	50/4 (50/4")	Silt With Sand And Limestone Fragments (ML) 60.0-60.3' - Same as 55.0-56.0' except 20% fine to medium sand-sized, 20% coarse sand to fine gravel-sized limestone fragments		
65	65.0						Complete soil sampling at 11:45 on 4/25/07
-23.5	65.1	0.0	SS-14	50/1 (50/1")	Limestone Fragments 65.0-65.1' - light gray, (N7), moderate to strong HCl reaction, fragments about 3/8"x3/4" in size Begin Rock Coring at 65.0 ft bgs See the next sheet for the rock core log		
70							
-28.5							
75							
-33.5							
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

WATER LEVELS : 2 ft bgs on 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-23.5	65.0	32	1	65.15' - Fracture, horizontal, rough, undulating, faces do not join together	Limestone Fragments 65.0-66.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), large infilled cavities 1"-2", trace organic inclusions No Recovery 66.2-68.2'	Start rock coring at 65.0' Water level approximately 2.0' (very muddy, may not be accurate, 4/25/07, 15:00) Driller's Remark: Rods dropped at 66.0-68.0', interpret lost recovery to be from 66.2-68.2'	
	2		66.1' - Fracture, 10 deg, rough, undulating, open, weathered faces, shell like fossil imprint on both sides of fracture				
	NR		66.15' - Fracture, horizontal, rough, undulating				
	3		68.15' - Fracture, horizontal, smooth, rounded face				
			3	68.35, 68.75' - Fractures (2), horizontal, smooth, undulating, tight	Limestone 68.2-69.7' - Same as 65.0-66.2' except small voids (<1/16") over 30% of core, fossiliferous with few 1/4"-1/2" cavities (molds) with couple of casts, increased large dissolution type cavities from 69.1-69.7' No Recovery 69.7-70.0'	R1: 5 minutes	
			3	69.15, 69.3, 69.55' - Fractures (3), 0-20 deg, rough, undulating, slightly weathered, open			
			NR	70.0-70.4' - Fracture zone, five 1-2" angular fragments			
			NR	70.4' - Fracture, horizontal, rough, stepped, terminates fracture zone above			
70	70.0	65	8	70.9' - Fracture, horizontal, rough, planar, open	Limestone 70.0-72.5' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to 10YR 5/4), moderate HCl reaction, medium strong (R3), highly fossiliferous with 30% fine (<1/16") voids and 5% 1/16"-1/8" voids/casts/molds, several larger cavities up to 1", trace organic laminations/inclusions 72.5-73.6' - Same as 70.0-72.5' except 5-10% fine (1/16") voids, very few large voids or cavities, gray 3/8" thick laminations throughout core 73.6-78.1' - Same as 72.5-73.6' except very weak (R1)	SC-1 collected at 71.5-72.5' R2: 7 minutes	
-28.5			1	71.5' - Fracture, 5 deg, rough, undulating			
			2	72.8, 73.1' - Fractures (2), 10 deg, rough, stepped, some fragmentation			
			2	73.0' - Fracture, 70 deg, rough, planar, tight, some fragmentation			
			3	73.85, 74.2, 74.45' - Fractures (3), 10 deg, rough, planar, open			
			3	74.8' - Fracture, 60 deg, rough, undulating, terminates with some rock fragments at end of core (75.0')			
75	75.0	0	>10	75.0-75.4' - Fracture zone, 1-2" fragments	78.1-78.65' - Same as 72.5-73.6' except 0-10% fine voids 78.65-78.8' - Same as 73.6-78.1' No Recovery 78.8-80.0'	R3: 4 minutes	
-33.5			>10	75.4' - Fracture, 10 deg, rough, planar, tight			
			>10	75.65, 75.7, 75.9, 76.1, 76.25, 76.27' - Fractures (6), horizontal, smooth to rough, planar, open			
			>10	76.25-76.4' - Fracture zone, fragments up to 3/4"			
			3	76.6' - Fracture, 45 deg, smooth, planar, slightly weathered, open			
			NR	76.8, 77.15' - Fractures (2), 10 deg, rough, undulating, open, with rock fragments between			
			NR	77.5-78.1' - Fracture zone			
80	80.0	28	2	78.1' - Bedding plane, horizontal, rough, stepped, open	Limestone 80.0-83.8' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, very weak to weak (R1 to R2), 25-40% fine (<1/16") voids throughout core, fossiliferous with many 3/16" to 3/8" fossil casts and molds, minor black infilling No Recovery 83.8-85.0'	Drilling ended at 80.0' on 4/25/07 Drilling resumed on 4/26/07 Rock varies from competent to friable intermittently with no clear contacts, but on the whole described as friable SC-2 collected at 80.5-81.6'	
-38.5			2	78.3' - Fracture, 20 deg, rough, stepped, open			
			>10	78.65' - Fracture, horizontal, rough, stepped, open			
			>10	80.1' - Fracture, 20 deg, rough, undulating, open			
			>10	80.4' - Fracture, 10 deg, rough, undulating, open			
			NR	81.6' - Mechanical break			
		NR	82.3' - Fracture, 60 deg, rough, undulating, open with lots of associated rock fragments				
85	85.0			82.3-83.5' - Fracture zone, angular 3/4"-2" fragments		R4: 5 minutes	



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

WATER LEVELS : 2 ft bgs on 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-43.5	R5-HQ 5 ft 100%	65	2	83.5, 83.7' - Fractures (2), 20 deg, rough, undulating, slightly weathered	[Symbolic Log Pattern]	Limestone 85.0-89.05' - Same as 68.2-69.7' except moderate yellowish brown, (10YR 5/4), very weak to medium strong (R1 to R3), 10-25% fine (<1/16") voids (fewer voids at 85.0-85.5', 88.1-88.2'), many 1/4" fossil molds/casts, some gray or beige infill in cavities, trace organics 89.05-89.6' - Same as 85.0-89.05' except interbedded zones of very weak (R1) rock with few voids and medium strong (R3) rock with 20% voids 89.6-93.4' - Same as 85.0-89.05'	R5: 5 minutes
1			85.45' - Fracture, 15 deg, rough, undulating, slightly weathered, open				
1			85.6' - Fracture, 10 deg, rough, planar, weathered but tight				
1			86.7' - Fracture, 40 deg, rough, undulating, tight				
2			87.05' - Fracture, vertical, rough, undulating, tight				
2			87.25' - Fracture, 30 deg, rough, undulating, tight, half of core is missing from 87.2-87.35'				
90	R6-HQ 5 ft 92%	72	2	88.1, 88.45' - Fractures (2), 10 deg, rough, undulating, tight	[Symbolic Log Pattern]	93.4-94.6' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to 10YR 5/4), very fine grained, mild to moderate HCl reaction, strong (R4), no small (1/16") voids at top, increase with depth to 5% at bottom, a few 1/4" round cavities No Recovery 94.6-95.0' Limestone 95.0-98.3' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 10-20% fine voids, small cavities up to 1/4" and larger and sometime elongated cavities contain light colored infill, trace organics 98.3-99.5' - Same as 95.0-98.3' except 3% fine voids, cavities up to 1" in size No Recovery 99.5-100.0' Limestone 100.0-104.6' - Same as 95.0-98.3' except sequence of rock with voids and rocks without, with cavities present at at transitions, maximum of 35% fine voids	R6: 15 minutes
90			1	89.25' - 10 deg, rough, undulating, tight to healed			
-48.5			2	89.8' - Fracture, horizontal, rough, undulating to stepped, open			
			2	90.8, 91.3' - Fractures (2), 30 deg, rough, planar, opposing, tight			
			2	91.9, 92.1' - Mechanical break (2), 60 deg, rough, planar to undulating			
			6	92.9' - Fracture, 10 deg, rough, planar, fine organic lamination			
95	R7-HQ 5 ft 90%	52	1	93.25' - Fracture, 60 deg, rough, stepped, beginning of fracture zone	[Symbolic Log Pattern]	98.3-99.5' - Same as 95.0-98.3' except 3% fine voids, cavities up to 1" in size No Recovery 99.5-100.0' Limestone 100.0-104.6' - Same as 95.0-98.3' except sequence of rock with voids and rocks without, with cavities present at at transitions, maximum of 35% fine voids	R7: 15 minutes
-53.5			1	93.3-93.5' - Fracture zone			
			NR	93.5, 93.8, 94.2' - Fractures (3), horizontal, smooth, planar			
			5	95.5, 95.9' - Fractures (2), rough, stepped, silty sand infilling, open			
			1	96.75' - Fracture, 40 deg, rough, stepped, tight			
			0	97.5' - Mechanical break			
100	R8-HQ 5 ft 92%	43	3	98.2' - Fracture, 10 deg, smooth, planar, open to tight	[Symbolic Log Pattern]	100.0-100.9' - Fracture zone, several horizontal and vertical fractures 100.9, 101.15, 101.4, 101.9, 102.25' - Fractures (5), 20-40 deg, rough, undulating, open 102.25' - Fracture, vertical, rough, undulating, some fragmentation 102.9' - Fractures (2), horizontal and 60 deg, rough, undulating, open 103.6' - Fracture, 20 deg, rough, undulating	R8: 10 minutes
-58.5			4	98.6, 99.5' - Fracture, vertical, rough, stepped, some fragmentation, some crystallization on surfaces			
			NR	100.0-100.9' - Fracture zone, several horizontal and vertical fractures			
			>10	100.9, 101.15, 101.4, 101.9, 102.25' - Fractures (5), 20-40 deg, rough, undulating, open			
			3	100.9, 101.15, 101.4, 101.9, 102.25' - Fractures (5), 20-40 deg, rough, undulating, open			
			3	102.25' - Fracture, vertical, rough, undulating, some fragmentation			
105	R8-HQ 5 ft 92%	43	1	102.9' - Fractures (2), horizontal and 60 deg, rough, undulating, open	[Symbolic Log Pattern]	No Recovery 104.6-105.0'	
			2	103.6' - Fracture, 20 deg, rough, undulating			
			NR				



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 ft bgs on 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-63.5	R9-HQ 5 ft 78%	37	6	104.45' - Fracture, horizontal, rough, stepped, beige-colored infill	[Symbolic Log]	Limestone 105.0-108.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), small (1/4") fossil cavities often with cast, 10-25% fine (1/16") voids 108.4-108.9' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, 20% gravel, 30% sand, 50% silt-sized particles, very friable No Recovery 108.9-110.0' Limestone 110.0-114.4' - Same as 105.0-108.4'	R9: 8 minutes
1			105.0-105.2' - Fracture zone, 1/2"-1" angular fragments				
>10			105.3' - Fracture, 50 deg, rough, stepped, open				
>10			105.9' - Fracture, 20 deg, rough, stepped, open				
NR			106.3' - Fracture, 45 deg, rough, planar, tight but weathered				
NR			107.1' - Fracture, 25 deg, rough, stepped, very open and weathered with dissolution and fragmentation				
110	R10-HQ 5 ft 100%	93	0	107.7-108.0' - Fracture zone, with angular rock fragments up to 2"	[Symbolic Log]	114.4-115.0' - Same as 110.0-114.4' except very weak (R1) 115.0-117.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (R1), 5-10% fine voids, few elongated 1/4"-1/2" fossil molds 117.5-117.95' - Same as 115.0-117.5' except medium strong to strong (R3 to R4), 0-10% fine voids, few elongated 1/4"-1/2" cavities/molds 117.95-118.2' - Same as 115.0-117.5' except very weak (R1), with increased voids to 15% 118.2-118.5' - Same as 115.0-117.5' except weak (R2), 10-15% fine voids No Recovery 118.5-120.0' Limestone 120.0-121.2' - moderate yellowish brown to dusky yellow, (10YR 5/4 to 5Y 6/4), fine grained, moderate HCl reaction, medium strong (R3), fine voids (<1/16"), fossiliferous with voids and cavities primarily elongated up to 1/4"-1/2" No Recovery 121.2-125.0'	Driller's Remark: Hit silt layer at 112.0' about 4" thick; not evident in core R10: 13 minutes SC-3 collected at 115.1-116.1' R11: 6 minutes R12: Run time not recorded
-68.5			0	108.15' - Fracture, 60 deg, rough, undulating, open			
			0	108.4' - Fracture, 10 deg, rough, stepped, open			
			1	112.3' - Fracture, 45 deg, rough, undulating, tight to open			
			1	114.9' - Fracture, horizontal, rough, undulating			
115	R11-HQ 5 ft 70%	47	1	115.1' - Fracture, horizontal, rough, undulating	[Symbolic Log]		
-73.5			2	116.5' - Fracture, 40 deg, rough, undulating, open			
			1	116.6' - Fracture, 5 deg, rough, undulating, slightly weathered, open			
			2	117.1' - Fracture, horizontal, rough, undulating, open			
			NR	118.05' - Fracture, 30 deg, rough, undulating, tight			
120	R12-HQ 5 ft 24%	8	>10	118.3' - Fracture, rough, undulating, tight to open, 3" side fracture	[Symbolic Log]		
-78.5			2	120.0-120.2' - Fracture zone, subangular rock fragments 1/2"-1" in size			
			NR	120.2' - Fracture, 5 deg, rough, undulating			
			NR	120.4, 121.0' - Fractures (2), 25 deg, rough, stepped to undulating, open with subangular fragments			
125	125.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 2 ft bgs on 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-83.5	R13-HQ 5 ft 84%	22	3	125.35' - Fracture, 80 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 125.0-126.25' - moderate yellowish brown to light olive brown, (10YR 5/4 to 5Y 5/6), fine grained, moderate HCl reaction, medium strong (R3), 10-20% small (1/16") voids, some 1/4" cavities 126.25-127.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, strong (R4), 0-10% fine (1/16") voids, very fine horizontal laminations No Recovery 127.0-127.8' Limestone 127.8-130.3' - Same as 125.0-126.25' except alternating very weak (R1) and medium strong (R3) zones below 128.8' 130.3-131.3' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, medium strong (R3), 20% voids <1/16", several 1/4" cavities and few larger elongated cavities No Recovery 131.3-135.0'	Driller's Remark: Rods dropped at 127.0-127.5', interpret lost recovery to be from 127.0-127.8' R13: 9 minutes	
8			125.45' - Fracture, 20 deg, rough, planar, tight but weathered					
NR			125.85' - Fracture, 0-70 deg, rough, stepped, tight, some minor fragmentation					
1			126.1' - Fracture, 10 deg, rough, undulating, minor fragmentation					
1			126.35, 126.4, 126.45, 126.6, 126.75, 126.85' - Bedding plane (6), horizontal, smooth, planar, tight to open					
>10			126.95' - Fracture, vertical, rough, planar					
130	R14-HQ 5 ft 26%	7	>10	127.8' - Fracture, 10 deg, open, weathered	[Symbolic Log]	Limestone 127.8-130.3' - Same as 125.0-126.25' except alternating very weak (R1) and medium strong (R3) zones below 128.8' 130.3-131.3' - moderate yellowish brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, medium strong (R3), 20% voids <1/16", several 1/4" cavities and few larger elongated cavities No Recovery 131.3-135.0'	R14: 6 minutes	
>10			128.9' - Fracture, 10 deg, rough, undulating, tight, weathered					
1			129.4' - Fractures (2), 20 deg and 70 deg, rough, undulating to planar, tight, friable					
NR			129.4-130.0' - Fracture zone, 1/2"-1" angular fragments					
NR			130.0-130.3' - Fracture zone, 1/2"-1" subangular rock fragments					
NR			130.3' - Fracture, horizontal, rough, planar					
135	R15-HQ 5 ft 52%	13	>10	130.6' - Fracture, 70 deg, rough, undulating, trace iron oxide infill of 1/4" cavity on fracture face	[Symbolic Log]	Limestone 130.0-135.3' - Same as 130.3-131.3' except moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2) 135.3-136.45' - moderate olive brown, (5Y 4/4), moderate HCl reaction, strong (R4), 0-3% fine (1/16") voids, horizontal bedding planes 1/8"-1/2" thick, trace organics 136.45-137.1' - alternating intervals of material same as 135.0-135.3' and same as 135.3-136.45' 137.1-137.6' - Same as 135.0-135.3' No Recovery 137.6-140.0'	Driller's Remark: 134.0-135.0' soft drilling Driller's Remark: Drilling rod sank approximately 2" during lunch break R15: 7 minutes	
>10			131.0' - Fracture, horizontal, rough, undulating, tight					
8			135.0-135.3' - Fracture zone, 1/2"-1" subangular rock fragments					
>10			135.3' - Fracture, 10 deg, rough, undulating, open					
NR			135.45' - Fracture, 5 deg, smooth, planar, open					
NR			135.5, 135.65, 135.75, 135.77' - Fractures (4), 10 deg, smooth, planar, tight but weathered					
140	R16-HQ 5 ft 64%	22	>10	136.45' - Fracture, 0-40 deg, rough, stepped, open	[Symbolic Log]	Limestone 140.0-140.15' - light olive brown, (5Y 5/6), fine grained, moderate HCl reaction, medium strong (R3), 20% small (1/16") voids 140.15-143.2' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, moderate HCl reaction, strong (R4), 3-10% small (<1/16") voids, several 1/4" to 1/2" cavities, some molds/cast, several up to 1" cavities, some with infill No Recovery 143.2-145.0'	R16: 12 minutes	
>10			136.5' - Fracture, horizontal, rough, planar					
4			136.6, 136.75, 136.85, 135.88, 136.95' - Fractures (5), horizontal, rough, planar, tight to open					
2			136.7' - Fracture, horizontal, rough, planar, healed					
0			137.1' - Fracture, 20 deg, rough, stepped, open, weathered					
NR			137.1-137.6' - Fracture zone, rock fragments 1/2"-2"					
145	R16-HQ 5 ft 64%	22	>10	140.15' - Bedding plane, horizontal, rough, stepped, open	[Symbolic Log]	Limestone 140.0-140.15' - light olive brown, (5Y 5/6), fine grained, moderate HCl reaction, medium strong (R3), 20% small (1/16") voids 140.15-143.2' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, moderate HCl reaction, strong (R4), 3-10% small (<1/16") voids, several 1/4" to 1/2" cavities, some molds/cast, several up to 1" cavities, some with infill No Recovery 143.2-145.0'	R16: 12 minutes	
>10			140.6, 140.8, 141.0, 141.25' - Fractures (4), 0-20 deg, rough, stepped, 1/8" infilling, open, breaks typically occur at large cavities					
145	R16-HQ 5 ft 64%	22	0	140.8-141.0' - Fracture, vertical, 1" fragments	[Symbolic Log]	Limestone 140.0-140.15' - light olive brown, (5Y 5/6), fine grained, moderate HCl reaction, medium strong (R3), 20% small (1/16") voids 140.15-143.2' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, moderate HCl reaction, strong (R4), 3-10% small (<1/16") voids, several 1/4" to 1/2" cavities, some molds/cast, several up to 1" cavities, some with infill No Recovery 143.2-145.0'	R16: 12 minutes	
>10			141.95' - Fracture, 10 deg, rough, undulating, highly weathered, tight, black organics on fracture face					



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-28	SHEET 9 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 ft bgs on 4/25/07 START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-103.5	R17-HQ 5 ft 58%	0	>10	142.3' - Fracture, 40 deg, rough, undulating 142.4-142.65' - Fracture zone, very angular 1"-2" rock fragments		Limestone 145.0-145.55' - light olive gray, (5Y 5/2), mottled appearance, fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), 5% fine (<1/16") voids, many 3/16" voids, irregular laminations, trace organics 145.55-146.8' - grayish orange, (10YR 7/4), very fine to fine grained, strong HCl reaction, strong (R4), no voids, no cavities 146.8-147.9' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild to strong HCl reaction, weak to strong (R2 to R4), strength decreasing with depth, 5% fine (<1/16") voids at top, increasing to 20% fine voids with depth No Recovery 147.9-150.0' Bottom of Boring at 150.0 ft bgs on 5/1/2007	Driller's Remark: 147.0-150.0' soft drilling R17: 12 minutes
3			142.65' - Fracture, 0-30 deg, rough, stepped 142.8' - Fracture, horizontal, rough, stepped, underlain by angular 1"-2" rock fragments				
8			143.05' - Fracture, 20 deg, rough, undulating 145.0-145.4' - Fracture zone, red staining on fracture faces, angular to subangular rock fragments, 1/2"-2"				
NR			145.4' - Fracture, 30 deg, rough, stepped, trace infill, weathered 145.55' - Fracture, 10 deg, smooth, undulating, open 145.7' - Fracture, 10 deg, rough, stepped, tight 145.9' - Fracture, 70 deg, smooth, undulating, tight, fracture extends from 145.55-146.2' 146.5, 146.8' - Fracture (2), 85 deg, rough, undulating, tight, 1/16" relief 146.8, 146.9' - Fractures (2), horizontal, weathered zone 147.5-147.9' - Fracture zone, angular to subangular 1/2"-1-1/2" fragments				
150	150.0						
-108.5							



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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
41.7	0.0	1.5	SS-1	1-2-4 (6)	Poorly Graded Sand With Silt (SP-SM) 0.0-1.5' - very light gray to yellowish gray, (N8 to 5Y 8/1), moist, loose, fine grained, 5% nonplastic fines, 10% organics, trace very fine sand-sized particles at the bottom		Installed 6" SW casing to approximately 5' below ground surface Using 24" split spoon (SS)
	1.5						
5	5.0	0.8	SS-2	0-1-2 (3)	Clayey Sand (SC) 5.0-5.4' - pale green, (10G 6/2), wet, very loose, very fine to fine grained, medium to high plasticity Silt (ML) 5.4-5.7' - grayish yellow, (5Y 8/4), wet, soft, nonplastic, very rapid dilatancy, moderate HCl reaction, carbonate derived		Water level assumed at 3.0' below ground surface due to wet sample at 5.0' (SS-2) and increasing moisture content in SS-1 SS-2 taken at 14:36
36.7	6.5						
10	10.0	1.4	SS-3	8-25-50/5 (75/11")	Silt (ML) 10.0-11.4' - grayish yellow mottled with moderate yellow, (5Y 8/4 with 5Y 7/6), moist, hard, nonplastic, very rapid dilatancy, moderate HCl reaction, trace very fine sand, trace black fragments, carbonate derived		
31.7	11.4						
15	15.0	1.0	SS-4	21-11-17 (28)	Silt (ML) 15.0-16.0' - grayish yellow, (5Y 8/4), moist, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, trace very fine to medium grained sand, carbonate derived		SS-4 taken at 14:50
26.7	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
21.7	20.0	1.5	SS-5	16-12-14 (26)	Silty Sand (SM) 20.0-21.5' - grayish yellow, (5Y 8/4), wet, medium dense, fine to coarse grained, moderate HCl reaction, trace fine gravel-sized, 30-40% nonplastic fines, carbonate derived		SS-5 taken at 14:56
	21.5						
25	25.0						
16.7	25.5	0.5	SS-6	50/5.5 (50/5.5")	Silty Sand (SM) 25.0-25.5' - grayish yellow, (5Y 8/4), wet, very dense, fine to coarse grained, moderate HCl reaction, 15% gravel-sized, 25-30% nonplastic fines, carbonate derived		SS-6 taken at 15:02
30	30.0						
11.7	31.5	1.2	SS-7	10-6-2 (8)	Silt (ML) 30.0-31.15' - light olive brown, (5Y 5/6), wet, loose, fine to medium grained, mild to moderate HCl reaction, 62% nonplastic fines, carbonate derived		SS-7 taken at 15:10
							Driller's Remark: Hard at 32.8'
35	35.9						
6.7		0.1	SS-8	50/1.5 (50/1.5")	Limestone Fragments And Silt 35.0-35.1' - light olive grey, (5Y 5/2), mild to moderate HCl reaction		SS-8 taken at 15:22
							Driller's Remark: Drilled into softer zone after 37.0'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
1.7	40.0	1.0	SS-9	35-50/5.5 (85/11.5")	Silt With Sand (ML) 40.0-41.0' - moderate olive brown to light olive brown, (5Y 4/4 to 5Y 5/6), moist to wet, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 25% fine to medium sand-sized, carbonate derived, trace very fine sand-sized black particles		Drill time from 37.0-40.0' approximately 1-1/2 minutes
	41.0						
45 -3.3	45.0	1.3	SS-10	35-48-50/4 (98/10")	Silt (ML) 45.0-46.3' - Same as 40.0-41.0' except trace medium sand-sized gray particles		SS-10 taken at 15:51
	46.3						
50 -8.3	50.0	1.4	SS-11	34-27-30 (57)	Silty Sand With Limestone Fragments (SM) 50.0-51.4' - light olive gray, (5Y 5/2), wet, very dense, fine to coarse grained, moderate HCl reaction, 40% of sample is fine to coarse gravel-sized limestone, 30-35% low plastic fines, all carbonate derived		SS-11 taken at 16:00
	51.5						
55 -13.3	55.0	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, dense, fine to coarse grained, moderate HCl reaction, 10% fine gravel-sized limestone, 40% low plastic fines, 5% organics, carbonate derived		SS-12 taken at 16:10
	55.8						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 5/30/07 START : 5/23/2007 END : 5/31/2007 LOGGER : T. Stewart, P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N) 50/2 (50/2")	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-18.3	60.0	0.0	SS-13		No Recovery 60.0-60.2' Begin Rock Coring at 61.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Will add 60.0' of 4" HW casing before continuing SPTs Last SPT taken on 5/23/07 at 60.0' (SS-13) Deviated hole during 4" HW casing installation
65 -23.3							
70 -28.3							
75 -33.3							
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
61.0	R1-NQ 5 ft 52%	1	1	61.5' - Fracture, horizontal, rough, undulating, possible contact between limestone and sand lens	Limestone 61.0-63.6' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2), 30% surface coverage of voids up to 1/8" at 61.0-61.5', increasing to 40-50% coverage from 61.5-63.6', 10% dark (possibly organics) clasts up to 1/8" size, increasing to 3/8" size at 62.6-63.0' No Recovery 63.6-66.0'	Borehole construction is 5.0' of 6" SW casing installed to 5.0' below ground surface with 62.0' of 4" HW casing installed to approximately 60.0' P. De Sa'rego begins logging Water level: 4.2' below ground surface on 5/30/07 Driller's Remark: Possible sand lens at 61.5-63.0'; driller will advance casing R1: 5 minutes 11:55 Advancing HW casing to 65.0'	
65 -23.3		7	7	62.0, 62.4' - Mechanical break (2)			
		0	0	62.6-63.0' - Fracture zone			
		NR	NR				
66.0	R2-NQ 5 ft 64%	1	1	66.6, 67.05, 67.25, 67.95' - Fractures (4), horizontal, smooth to rough, planar to undulating, 1/8" relief	Limestone 66.0-67.95' - Same as 61.0-63.6' except trace cavities/fossil casts up to 1-9/16"x3/8" at 66.7- 67.3' 67.95-69.2' - Same as 61.0-63.6' except very weak to weak (R1 to R2), 10-15 fossil casts/cavities up to 1-3/16"x3/8" No Recovery 69.2-71.0'	R2: 6 minutes	
		3	3	68.65' - Fracture, horizontal, rough, undulating, 1/4" relief			
70 -28.3		>10	>10	69.05' - Fracture, <10 deg, rough, undulating			
		NR	NR				
71.0	R3-NQ 5 ft 48%	0	0	72.0-72.4' - Fracture zone	Limestone 71.0-71.95' - Same as 61.0-63.6' except 20-40% surface coverage of voids up to 3/16" (percentage increasing with depth), 10-20%, cavities up to 1-3/16"x3/8", large (3-7/8"x3-1/8") cavity infilled with fine grained, weak (R2) carbonate material at 71.2-71.6', 20% of core contains black organic thread-like inclusions up to 1-9/16"x1/8" long 71.95-72.4' - Same as 61.0-63.6' except fine grained, very weak (R1), trace voids 72.4-73.4' - Same as 71.0-71.95' except very weak (R1) No Recovery 73.4-76.0' Limestone 76.0-76.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), 10-15% surface coverage of voids up to 1/8", trace infilled cavities up to 1-3/16"x3/8", infilled with fossiliferous limestone	SC-1 collected at 71.0-71.95' R3: 7 minutes	
		>10	>10	72.6' - Mechanical break			
75 -33.3		>10	>10	72.9-73.4' - Fracture zone			
		NR	NR				
76.0	R4-NQ 5 ft 40%	>10	>10	76.0-76.1' - Fracture zone 76.1-76.4' - Mechanical break 76.4-76.7' - Fracture zone	R4: 9 minutes		
		2	2	77.25, 77.7' - Fracture or mechanical break, rough, undulating, tight			
80 -38.3		NR	NR				
81.0		NR	NR				



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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
85 -43.3	R5-NQ 5 ft 88%	75	2	81.7, 82.3, 82.5' - Mechanical break (3)		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 voids up to 1/8", 10-15% casts/cavities up to 1"x2" infilled with very soft black (possible organic) material No Recovery 78.0-81.0'	R5: 6 minutes	
			3	82.0' - Fracture, <5 deg, smooth, planar to undulating, tight		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 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' except weak to medium strong (R2 to R3)		
			1	82.95, 83.4' - Fractures (2), <5 deg, smooth, planar to undulating		Limestone 85.1-85.4' - Same as 81.0-83.4'		
			1	83.5' - Mechanical break		No Recovery 85.4-86.0'		
			3	84.25' - Fracture, 10-15 deg, smooth, undulating		Limestone 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", trace casts/cavities up to 3/8"x3/8"	R6: 9 minutes	
			NR	85.0, 85.2' - Fractures (2), 10-15 deg, rough, undulating		Limestone 87.6-88.8' - Same as 86.0-87.6' except medium strong (R3), trace dark (organic) clasts, 15% casts/cavities up to 3/8"x3/8"		
90 -48.3	R6-NQ 5 ft 56%	22	1	86.3' - Mechanical break		No Recovery 88.8-91.0'		
			>10	86.6' - Mechanical break		Limestone 91.0-91.4' - Fracture zone		
			>10	87.1- 88.1' - Fracture zone		91.7-91.75' - Fracture zone		
			NR	88.3-88.6' - Fracture zone		92.0' - Fracture, <10 deg, rough, undulating, 1/16" relief		
95 -53.3	R7-NQ 5 ft 70%	42	6	91.0-91.4' - Fracture zone	92.75' - Fracture or mechanical break, 35-40 deg, rough, undulating, 1/16" relief	R7: 6 minutes		
			4	91.7-91.75' - Fracture zone	93.9' - Fracture, horizontal, rough, undulating, 1/8-3/16" relief			
			1	92.0' - Fracture, <10 deg, rough, undulating, 1/16" relief	94.2-94.5' - Mechanical break			
			0	92.75' - Fracture or mechanical break, 35-40 deg, rough, undulating, 1/16" relief				
			NR	93.9' - Fracture, horizontal, rough, undulating, 1/8-3/16" relief				
100 -58.3	R8-NQ 5 ft 98%	38	2	94.2-94.5' - Mechanical break	96.0-96.4' - carbonate derived, 30% nonplastic fines	R8: 5 minutes		
			>10	96.4' - sand/limestone contact, horizontal, rough, undulating	Silty Sand (SM)			
			4	96.6' - Fracture, horizontal, rough, undulating				
			4	97.4' - Fracture, horizontal, rough, undulating				
			3	97.55-97.75' - Fracture zone				
			6	98.1, 98.5' - Fractures (2), horizontal, rough, undulating, 3/16" relief				
			3	98.6' - Fracture, 30 deg, rough, undulating				
			6	98.9-99.2' - Fracture zone (3 or more), 0-60 deg, rough, undulating				
			6	99.55, 99.85, 100.25' - Fractures (3), <30 deg, rough, undulating				
101.0				100.55-100.9' - Fracture zone				



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -63.3	R9-NQ 5 ft 44%	31	NR >10 4 >10 NR	101.5-102.1' - Fracture zone 102.5' - Fracture, 0-30 deg, rough, undulating, 1/8" relief 103.0-103.2' - Fracture zone, <3/16" relief	Limestone 96.4-100.9' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), extremely weak (R0) at 97.6', 15-20% surface coverage of voids up to 1/8", 10% casts/cavities up to 2"x3/8", partial recrystallization of carbonate material in voids No Recovery 100.9-101.0' Limestone 101.0-102.1' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2), 5-10% surface coverage of voids up to 1/16", trace cavities up to 3/4"x3/8" 102.1-103.2' - Same as 101.0-102.1' except very weak (R1) No Recovery 103.2-106.0' Limestone 106.0-109.4' - Same as 101.0-102.1' except very weak (R1) from 106.0-107.9' and 108.2-109.4' No Recovery 109.4-111.0'	R9: 3 minutes Driller's Remark: Fluid loss at 105.0' below ground surface	
110 -68.3	R10-NQ 5 ft 68%	46	>10 1 2 1 NR	106.0-106.3' - Fracture zone 106.5, 106.95' - Fractures (2), <10 deg, rough, undulating 107.7' - Fracture, <10 deg, rough, undulating 108.0' - Fracture, 30 deg, rough, undulating 108.5' - Fracture or mechanical break, <15 deg, rough, stepped, tight, <1/16" relief 109.3' - Fracture, horizontal, rough, undulating, 3/16" relief	Limestone 106.0-109.4' - Same as 101.0-102.1' except very weak (R1) from 106.0-107.9' and 108.2-109.4' No Recovery 109.4-111.0'	R10: 3 minutes	
115 -73.3	R11-NQ 5 ft 14%	0	3 NR	111.0-111.3' - Fracture zone 111.4, 111.7' - Fractures (2), horizontal, rough, undulating	Limestone 111.0-111.7' - Same as 101.0-102.1' No Recovery 111.7-116.0'	Driller's Remark: No circulation	
120 -78.3	R12-NQ 5 ft 56%	27	>10 2 4 NR	116.0-116.2' - Fracture zone 116.5-116.85' - Fracture zone 117.5' - Fracture, horizontal, rough, planar to stepped, 1/8" relief 117.6-117.85' - Fracture, 50 deg, rough, undulating, 1/8" relief 118.05' - Fracture, horizontal, rough, undulating, tight, 1/16" relief 118.4-118.8' - Fracture zone	Limestone 116.0-116.5' - Same as 101.0-102.1' 116.5-118.8' - pale yellowish orange to light gray, (10YR 8/6 to N7), coarse grained, strong HCl reaction, extremely weak to very weak (R0 to R1), trace voids (<3/16"), trace cavities to 1"x1/8", highly friable, fossiliferous, "coquina" appearance, increase in gray color (fossils) corresponds to increase in HCl reaction and decrease in hardness No Recovery 118.8-121.0'	Water level: 4.4' below ground surface on 5/31/07 Driller's Remark: Still no circulation R12: 4 minutes	



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -83.3	R13-NQ 5 ft 92%	36	2 2 3 3 2 NR	121.85, 121.9' - Mechanical break (2) 121.5-123.0' - Fracture zone 123.3' - Fracture, horizontal, rough, undulating, 3/16" relief 123.95' - Fracture, 20 deg, rough, undulating, 1/8" relief 124.35' - Fracture, <10 deg, rough, undulating 124.45-124.7' - Fracture, 60 deg, rough, undulating 124.85' - Fracture, 60 deg, rough, undulating, 3/16" relief 124.85-125.2' - Mechanical break, 60 deg 125.25' - Mechanical break	Limestone 121.0-121.55' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2), 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 121.0-121.55' except 10-20% surface coverage of casts/cavities up to 1-3/16"x3/8", with trace carbonate infill/recrystallization 124.7-125.6' - Same as 121.0-121.55' No Recovery 125.6-126.0' 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 to 9/16"x9/16" No Recovery 126.1-131.0'	SC-2 collected at 121.0-121.9' Driller's Remark: No fluid circulation R13: 5 minutes Driller's Remark: No fluid circulation	
130 -88.3	R14-NQ 5 ft 2%	0	NR	131.0	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 to 9/16"x9/16" No Recovery 126.1-131.0'	R14: 3 minutes	
135 -93.3	R15-NQ 5 ft 58%	7	8 5 4 NR	131.1, 131.2, 131.25, 131.45, 131.6' - Fractures (5), horizontal, smooth to rough, planar 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 133.2, 133.4, 133.6, 133.65' - Fractures (4), <10 deg, rough, undulating	Limestone 131.0-133.9' - Same as 121.0-121.55' except coarse grained, 50-60% surface coverage of voids up to 3/16" at 132.1-132.3', and medium gray (N5) mottling at 133.2-133.9' No Recovery 133.9-136.0'	Driller's Remark: No fluid circulation R15: 4 minutes	
140 -98.3	R16-NQ 5 ft 82%	28	4 3 5 0 NR	136.1, 136.9' - Fractures (2), <5 deg, rough, undulating, 1/8" relief 136.75, 137.5' - Fractures (2), 15-20 deg, rough, undulating, 3/8" relief 137.25- 137.5' - Fracture zone, <10 deg, rough, undulating, 4 fractures 137.6-138.15' - Fracture zone 139.05, 139.1, 139.4, 139.7, 139.9' - Fractures (5), <10 deg, rough, undulating, <1/16" relief, black stains on 80% of surface	Limestone 136.0-136.9' - Same as 121.0-121.55' 136.9-140.1' - medium light gray and very pale orange, (N6 and 10YR 8/2), fine grained, mild to moderate HCl reaction, medium strong to strong (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' No Recovery 140.1-141.0'	Driller's Remark: No fluid circulation SC-3 collected at 138.15-139.05' R16: 14 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -103.3	R17-NQ 5 ft 40%	33	2 1	141.1' - Fracture, horizontal, rough, undulating, 3/8" relief 141.85' - Fracture, 15 deg, rough, undulating, 1/8" relief 142.05' - Fracture, horizontal, rough, undulating	Limestone 141.0-141.9' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), fine grained, mild HCl reaction, medium strong (R3), trace (<5%) surface coverage of voids up to 1/16", trace cavities up to 9/16"x3/8" 141.9-142.05' - Same as 121.0-121.55' 142.05-142.8' - Same as 141.0-141.9' 142.8-143.0' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2), 60-70% surface coverage of voids up to 3/16", 10-15% casts/cavities up to 3/4"x3/8" No Recovery 143.0-146.0' Limestone 146.0-146.55' - Same as 142.8-143.0' 146.55-148.5' - Same as 141.0-141.9' 148.5-149.2' - Same as 142.8-143.0' No Recovery 149.2-151.0'	Driller's Remark: Very soft at 143.3-145.0'	
146.0		NR				R17: 7 minutes	
150 -108.3	R18-NQ 5 ft 64%	42	2 3 3 1	146.35, 146.55' - Fractures (2), horizontal, rough, planar 147.05, 147.25' - Fractures (2), <15 deg, rough, undulating, tight 147.75' - Fracture, <15 deg, rough, undulating, tight 148.65-149.05' - Fracture zone 148.65' - Fracture, <15 deg, rough, undulating, tight		SC-4 collected at 147.75-148.60'	
151.0		NR				R18: 7 minutes Total depth of boring at 151.0' below ground surface 10:19, 5/31/07	
						Bottom of Boring at 151.0 ft bgs on 5/31/2007	



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 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.2	0.0	1.4	SS-1	2-4-4 (8)	Poorly Graded Sand With Silt (SP-SM) 0.0-0.45' - dark gray, (N3), moist, loose, fine grained, no HCl reaction, silica sand to 1/32", 15% fines, predominately organics, roots Poorly Graded Sand (SP) 0.45 - 1.4' - very light gray to light gray, (N8 to N7), moist, loose, very fine grained, no HCl reaction, silica sand to <1/32", trace nonplastic fines		
5 37.2	5.0	0.4	SS-2	2-5-3 (8)	Silty Sand (SM) 5.0-5.9' - light brownish gray with medium gray mottling, (5YR 6/1 with N4), wet, loose, very fine grained, medium to high plasticity, no HCl reaction, silica sand to <1/32", 30-40% fines, trace roots		Water level 2.4' below ground surface on 5/03/07
10 32.2	10.0	1.2	SS-3	1-6-6 (12)	Silt (ML) 10.0-11.2' - yellowish gray, (5Y 7/2), wet, medium stiff, nonplastic, very rapid dilatancy, moderate to strong HCl reaction, trace very fine sand-sized, carbonate		
15 27.2	15.0	1.5	SS-4	0-21-35 (56)	Sandy Silt (ML) 15.0-16.5' - yellowish gray, (5Y 5/2), wet, hard, medium dense, nonplastic, very rapid dilatancy, moderate HCl reaction, 25-30% fine to coarse sand-sized, 2-3 limestone lenses to 1" thick, carbonate derived		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
22.2	20.0	0.4	SS-5	6-6-6 (12)	Silty Sand With Limestone Fragments (SM) 20.0-20.9' - light olive gray, (5Y 5/2), wet, medium dense, fine to coarse grained, moderate HCl reaction, 35% fine to coarse gravel-sized limestone fragments, 30% plastic fines, all carbonate		
	21.5						
25	25.0	0.6	SS-6	4-2-8 (10)	Sandy Silt (ML) 25.0-25.6' - dusky yellow, (5Y 6/4), wet, stiff, medium dense, fine to medium grained, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 35-40% fine to medium sand, 10-15% fine gravel-sized limestone fragments, all carbonate		
17.2	26.5						
30	30.0	0.9	SS-7	12-8-15 (23)	Sandy Silt With Limestone Fragments (SM) 30.0-30.85' - Same as 25.0-25.6' except very stiff, 15% fine to coarse gravel-sized limestone fragments		
12.2	31.5						
35	35.0	0.2	SS-8	50/2 (50/2")	Limestone Fragments 35.0-35.2' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, very poor recovery, two limestone fragments, to 1/2"		
7.2	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: B-30	SHEET 3 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 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
2.2	40.0	0.2	SS-9	50/2 (50/2")	Limestone Fragments 40.0-40.2' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, wafer-shaped limestone fragments to 1/4" thick, fine to coarse sand-sized fragments		
45 -2.8	45.0 45.2	0.2	SS-10	50/2.5 (50/2.5")	Limestone Fragments And Silty Sand (SM) 45.0-45.2' - 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 See the next sheet for the rock core log		
50 -7.8							
55 -12.8							
60							



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 ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-2.8	45.0		1	45.0-45.5' - Fracture, 85 deg, rough, undulating	Limestone 45.0-48.5' - moderate olive brown, (5Y 4/4), mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), very fine to medium grained voids to 1/16", 25-30% casts/molds up to 3/8" over 5-10% of surface, trace black (N1) carbonaceous inclusions No Recovery 48.5-50.0'	Begin rock coring at 45' R1: 4 minutes	
	R1-NQ 5 ft 70%	33	>10	46.6' - Fracture, horizontal, rough, undulating, open			
			3	46.7-46.9' - Fracture zone, <5-90 deg, rough, undulating, open			
			2	47.1' - Fracture, horizontal, rough, undulating, open			
			NR	47.5' - Fracture, 15-25 deg, rough, undulating, tight			
				47.8-48.4' - Fracture, 85-90 deg, rough, undulating, tight			
50	50.0		>10	48.1' - Fracture, horizontal, rough, stepped, tight			
-7.8			3	48.4' - Fracture, 10 deg, rough, undulating, tight			
	R2-NQ 5 ft 90%	23	3	50.0-50.2' - Fracture zone, angular gravel-sized limestone fragments			
			>10	50.55-50.8' - Fracture, 45 deg, rough, undulating, tight			
			1	51.0-51.35' - Fracture, 80-85 deg, rough, undulating, open			
			NR	51.7' - Fracture, horizontal, rough, undulating, open			
			NR	51.9-52.1' - Fracture, 70-75 deg, rough, undulating, open			
55	55.0		4	52.3' - Fracture, 20 deg, rough, undulating, semi-tight	Limestone 50.0-51.4' - moderate olive brown, (5Y 4/4), moderate HCl reaction, 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 fossiliferous 51.4-54.5' - moderate olive brown, (5Y 4/4), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, becoming very weak (R1) at 54.0' and below, black carbonaceous/organic lenses/laminae (1/16") very abundant at 53.5', voids (<1/16") over 20-25%, cavities (<3/8") over 5% of surface, poorly fossiliferous No Recovery 54.5-55.0' Limestone 55.0-56.8' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, weak (R2), low density, thin black carbonaceous laminae at 55.0-55.2' with discontinuous carbonaceous laminae below, voids (generally <1/16") over 15-20% of surface, some cavities (<1/16"), fossil mold/casts sparse 56.8-57.7' - yellowish gray, (5Y 7/2), dense, mild HCl reaction, medium strong (R3), voids (1/16" or less) 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), 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	R2: 6 minutes R3: 9 minutes Hit pocket at 60' Losing sample core kicked over sideways, no way of knowing orientation of core Rock re-ordered rock into more logical sequence during field review No recovery due to blocked core barrel R4: 16 minutes	
-12.8			3	52.6, 52.8, 53.1, 53.3' - Fractures (4), horizontal, rough, undulating, semi-tight			
	R3-NQ 5 ft 54%	17	3	53.4-53.8' - Fracture zone, horizontal			
			4	54.0' - Fracture, 50 deg, rough, undulating, open			
			NR	55.25' - Fracture, <5-70 deg, rough, stepped, open			
			NR	55.42' - Fracture, <5 deg, rough, stepped, open, black carbonaceous stain over 30% of surface			
			NR	55.54' - Fracture, 10 deg, smooth, planar to stepped, open, black carbonaceous film over 20%			
			NR	55.68' - Fracture, <5 deg, rough, stepped, open, black carbonaceous film over 5%			
60	60.0		1	56.0' - Fracture, <5 deg, rough, undulating, tight			
-17.8			NR	56.52' - Fracture, horizontal, rough, planar, tight			
	R4-NQ 5 ft 9%	0	NR	56.82' - Fracture, 0-60 deg, rough, stepped, open			
			NR	57.25' - Fracture, <5 deg, smooth, undulating, open			
			NR	57.35' - Fracture, <5 deg, smooth, planar, open, carbonaceous staining/film over 10%			
			NR	57.5-57.6' - Fracture zone, gravel-sized rock fragments, rounded to angular			
			NR	60.25' - Fracture, horizontal, smooth, undulating, tight, black carbonaceous film covering 20% of rock surface			
65	65.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-22.8	R5-NQ 5 ft 96%	13	2	65.1' - Fracture, horizontal, rough, undulating, open	[Symbolic Log]	No Recovery 60.45-65.0' Limestone 65.0-68.8' - light olive gray, (5Y 5/2), very fine to fine grained, mild HCl reaction, extremely weak (R0), friable, nonplastic silt along fractures, voids to 1/16" over 10%, casts/molds up to 3/8" over <5% of surface 68.8-69.8' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to 1/16", molds/casts to 3/8", on 5-10% of surface, occasional carbonaceous laminae on 1-3% of surface No Recovery 69.8-70.0' Limestone 70.0-70.7' - moderate olive brown, (5Y 4/4), fine to medium grained, moderate to strong HCl reaction, medium strong (R3), voids to 1/16" on 35-40% of surface, casts/molds to 3/8" over 5%, fossiliferous (molds/casts) 70.7-73.6' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, medium strong (R3), voids to 1/16" over 3-5% of surface, sparsely distributed throughout interval and concentrated in possible cavity infillings, fossils rare to absent, casts/molds to 3" on 10% of surface, silty sand along fractures 73.6-74.3' - Same as 70.7-73.6' except yellowish gray, (5Y 7/2), extremely weak (R0), becoming coarser grained, with very soft clay along fractures, friable, sandy texture 74.3-74.7' - Same as 70.7-73.6' except yellowish gray, (5Y 7/2) No Recovery 74.7-75.0' Limestone 75.0-77.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/4" over 3-5%, cavities to 3/8" over <1% of surface, poorly fossiliferous 77.2-77.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), nonfossiliferous, very thin discontinuous black carbonaceous laminae, rounded to subrounded clast-like inclusions (3/8"-3/4") of moderate olive brown (5Y 4/4), extremely weak (R0) limestone	R5: 10 minutes
70			4	65.9, 66.1, 66.2' - Mechanical break (3)			
-27.8			3	66.5' - Fracture, 5-10 deg, smooth, undulating, tight			
70.0			3	66.7' - Fracture, 10 deg, rough, undulating, tight			
			1	67.1' - Fracture, horizontal, rough, undulating, open			
			NR	67.3' - Fracture, 45-50 deg, smooth, stepped, open			
	R6-NQ 5 ft 94%	53	2	67.6' - Fracture, 45 deg, rough, undulating to stepped, open	[Symbolic Log]	75.0-77.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/4" over 3-5%, cavities to 3/8" over <1% of surface, poorly fossiliferous 77.2-77.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), nonfossiliferous, very thin discontinuous black carbonaceous laminae, rounded to subrounded clast-like inclusions (3/8"-3/4") of moderate olive brown (5Y 4/4), extremely weak (R0) limestone	R6: 10 minutes
			0	68.3' - Fracture, 0-5 deg, rough, undulating, open			
			3	68.4' - Fracture, 0-5 deg, rough, undulating, open			
			>10	68.8' - Fracture, 0-5 deg, rough, undulating, tight			
			2	69.5' - Fracture, horizontal, rough, undulating, open			
			NR	70.7' - Fracture, 0-5 deg, rough, undulating, open			
75	R7-NQ 5 ft 94%	48	3	70.75' - Fracture, horizontal, rough, undulating, open	[Symbolic Log]	75.0-77.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/4" over 3-5%, cavities to 3/8" over <1% of surface, poorly fossiliferous 77.2-77.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), nonfossiliferous, very thin discontinuous black carbonaceous laminae, rounded to subrounded clast-like inclusions (3/8"-3/4") of moderate olive brown (5Y 4/4), extremely weak (R0) limestone	R7: 9 minutes
-32.8			0	72.2' - Fracture, 10 deg, rough, stepped, open			
			>10	72.6-72.8' - Fracture, 60-65 deg, rough, undulating, open			
			0	72.8-73.6' - Fracture, 85-90 deg, rough, undulating, tight			
			3	73.6-73.9' - Fracture zone, 0-90 deg, rough, stepped to undulating, open			
			NR	74.2, 74.3' - Fractures (2), horizontal, smooth, planar, open			
80	R8-NQ 5 ft 58%	30	3	75.1' - Fracture, 0-10 deg, rough, stepped, open	[Symbolic Log]	75.0-77.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/4" over 3-5%, cavities to 3/8" over <1% of surface, poorly fossiliferous 77.2-77.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), nonfossiliferous, very thin discontinuous black carbonaceous laminae, rounded to subrounded clast-like inclusions (3/8"-3/4") of moderate olive brown (5Y 4/4), extremely weak (R0) limestone	R8: 7 minutes
-37.8			0	75.2-75.3, 75.4-75.5' - Fractures (4), 30 deg, rough, undulating, tight			
			1	77.2' - Fracture, 0-5 deg, smooth, stepped, open			
			3	77.4' - Fracture, 0-15 deg, smooth, stepped, open			
			NR	77.5-78.0' - Fracture zone, 0-70 deg, rough, stepped to undulating, open, gravel sized limestone rock fragments			
			>10	78.6-78.7' - Mechanical break			
85			1	79.0-79.3' - Fracture, 50-60 deg, rough, undulating, tight			
			3	79.45' - Fracture, horizontal, rough, undulating, tight			
			NR	79.6' - Fracture, 50 deg, rough, stepped, open			
				80.0-80.2' - Fracture zone, gravel-sized limestone rock fragments			
				80.35-80.5' - Fracture, 70-80 deg, rough, undulating, open			
				80.5-80.7' - Fracture zone, rough, planar to stepped, horizontal to high angle, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-42.8	R9-NQ 5 ft 88%	37	2	81.3-81.6' - Fracture, 30-80 deg, rough, undulating, orientation angle increasing with depth	|	Limestone 77.7-79.7' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, medium strong (R3), voids to 1/16" on 20-25%, cavities to 3/4" on 1-2%, occasional hair-line incipient fracture traces No Recovery 79.7-80.0' Limestone 80.0-82.9' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), voids to 1/16" on 20-25%, cavities 1-3/16"-3/4" except at 80.9-81.0', larger cavities 1-3/16x1-3/16x3/8" on >5% , trace fossil molds/casts No Recovery 82.9-85.0' Limestone 85.0-86.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/16" on 15-18%, cavities to 3/4" on <5%, fossiliferous (molds and casts) 86.6-88.1' - pale olive brown, (5Y 5/6), fine grained, weak to medium strong (R2 to R3), void spaces over 25% of surface, solution cavities over 15-20%, trace organics, iron oxide patina on some cavities, fossiliferous (molds/casts) No Recovery 88.1-103.0'	Driller's Remark: (87.0-90.0') open hole in rock, rods dropped one more foot when released 87-88' void 88-89.5' solid 89.5-91' void Driller's Remark: Lost circulation at 87.0' R9: 9 minutes	
			>10	82.0' - Fracture, horizontal, rough, undulating, tight				
			1	82.35-82.5' - Fracture, 20-30 deg, rough, undulating, tight				
			0	82.8' - Fracture, 0-5 deg, rough, undulating, open				
			NR	85.1' - Fracture, 0-10 deg, rough, undulating, open				
90	R10-NQ 5 ft 0%	0	NR	85.35-85.4' - Fracture, 5-10 deg, rough, undulating, open	|	86.1' - Fracture, horizontal, rough, undulating, tight 86.5-87.2' - Fracture zone 87.5' - Fracture, 5 deg, rough, undulating, open	Driller's Remark: 91.0-95.0' open, minimal resistance as sporadic stringers of rock, or small breccia clasts, yield rig chatter R10: 2 minutes	
-47.8								
95	R11-NQ 5 ft 0%	0	NR		|		Driller's Remark: 95.0-103.0', rods were apparently sitting on a small piece of rock; when connection was made the rods free fell to 103.0' with no recovery R11: Run time not recorded	
-52.8								
100	R12-NQ 5 ft 14%	0	NR		|		Actual recovery was from 103.0-103.7' R12: 3 minutes	
			0					
			NR					
105								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-62.8	R13-NQ 5 ft 64%	27	0	105.1' - Fracture, horizontal, rough, undulating, open	Limestone 103.0-103.7' - yellowish gray, (5Y 7/2)), strong HCl reaction, extremely weak to very weak (R0 to R1), medium grained, sandy texture, voids (<1/16") over 1-2% of surface, fossils absent No Recovery 103.7-105.0' Limestone 105.0-105.6' - Same as 103.0-103.7' 105.6-108.2' - light olive gray to pale yellowish brown, (5Y 5/2 to 10YR 6/2), mild to moderate HCl reaction, weak (R2), voids (<1/16") over 5% of surface, cavities (3/8" to 3/16") <1%, trace fossil molds/casts No Recovery 108.2-120.0'	SC-2 collected at 105.9-107.2' R13: 12 minutes	
0			105.25' - Fracture, 0-5 deg, rough, undulating, open				
5			105.5' - Fracture, horizontal, rough, undulating, open				
1			105.6-105.8' - Fracture zone				
NR			107.05' - Fracture, 5 deg, rough, undulating, tight				
110	R14-NQ 5 ft 0%	0	NR	107.4' - Fracture, 40 deg, rough, undulating, open	R14: 4 minutes		
-67.8			NR	107.5' - Fracture, 0-5 deg, rough, undulating, open			
115	R15-NQ 5 ft 0%	0	NR	107.7' - Fracture, 0-2 deg, rough, undulating, open	No recovery, pulled cutter casing and found core fragment which may have been blocking inner core barrel; problem may be due to inner barrel not locking properly Solution: Lift outer barrel off bottom of hole before locking in inner barrel R15: 5 minutes		
-72.8			NR	108.0' - Fracture, 0-2 deg, rough, undulating, open			
120	R16-NQ 5 ft 20%	0	>10	120.2' - Fracture, 0-80 deg, smooth, stepped, open	Limestone 120.0-120.5' - light olive gray, (5Y 5/2), very fine to fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids to 1/16" over <5% of surface, casts to 3/16" over <5%, fossils absent 120.5-121.0' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), sandy texture, very similar to 103.0-103.7' No Recovery 121.0-125.0'	R16: 4 minutes	
-77.8			NR	120.3' - Fracture, horizontal, rough, stepped, open			
125				120.3-120.5' - Fracture zone, angular to subrounded gravel-sized rock fragments			
				120.5-120.75' - Fracture zone, 80 deg, rough, undulating, tight, fracture plane bounded on either end by horizontal, stepped to undulating, rough, open bedding planes			
				120.75-121.0' - Fracture zone, subrounded gravel-sized rock fragments			



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 ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-82.8	R17-NQ 5 ft 58%	42	2	125.25' - Fracture, 0-5 deg, rough, stepped, tight	[Symbolic Log]	Limestone 125.0-126.7' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), fine to very fine grained, strong HCl reaction, extremely weak to weak (R0 to R2), fossiliferous 126.7-127.9' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 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'	Water level 2' below ground surface on 5/6/07 R17: 6 minutes	
3			125.6' - Fracture, 0-5 deg, rough, undulating, open					
3			126.3' - Fracture, horizontal, rough, undulating, open 126.4, 126.5' - Fractures (2), horizontal, smooth, planar, open					
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					
130	R18-NQ 5 ft 84%	45	4	130.1' - Fracture, 10-15 deg, rough, undulating, open	[Symbolic Log]	Limestone 130.0-131.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over 5-10% of surface, cavities to 3/8" <5%, fossiliferous (predominantly micro-fossils), very irregular, undulatory surface 131.2-131.85' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids <1%, cavities (<1/8") over 1% surface, rock surface generally uniform (slightly undulatory), fossils absent, "silty textured" 131.85-132.2' - light olive gray, (5Y 5/2), dense, fine grained, moderate to strong HCl reaction, medium strong (R3), voids (<1/16") over 1-2% surface, cavities (3/8"x1/32") rare, fossils trace to absent 132.2-134.2' - moderate yellowish brown, (10YR 5/4), dense, moderate 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, trace very dark or black carbonaceous laminae seen at 133.0-134.2' No Recovery 134.2-135.0'	SC-3 collected at 132.7-133.5' R18: 5 minutes R19: 16 minutes	
-87.8			3	130.2' - Fracture, 5-10 deg, rough, undulating, open				
135			4	130.4-130.5' - Fracture, 30-35 deg, rough, undulating, open				
-92.8			3	130.8' - Fracture, 0-5 deg, rough, undulating, open				
135			NR	131.2' - Fracture, 5-10 deg, rough, undulating, open 131.5' - Fracture, 0-5 deg, smooth, undulating, semi tight 131.9' - Fracture, horizontal, smooth, stepped 132.1' - Fracture, horizontal, rough, planar, open				
140	R19-NQ 5 ft 76%	22	3	132.2-132.3' - Fracture zone, 0-50 deg, smooth to rough, planar to stepped, open	[Symbolic Log]	Limestone 132.2-134.2' - moderate yellowish brown, (10YR 5/4), dense, moderate 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, trace very dark or black carbonaceous laminae seen at 133.0-134.2' No Recovery 134.2-135.0'	R19: 16 minutes	
-97.8			3	132.3' - Fracture, 0-5 deg, rough, undulating, open				
140			3	132.7' - Mechanical break				
140			5	133.5' - Fracture, 10 deg, rough, undulating, tight				
140			NR	133.6-133.75' - Fracture zone, 0-50 deg, smooth to rough, planar to stepped 133.75' - Fracture, 0-5 deg, rough, undulating, open 135.1' - Fracture, 0-60 deg, rough, stepped, open				
140			NR	135.4' - Fracture, 10 deg, smooth, stepped, open				
145	R20-NQ 5 ft 58%	20	4	135.9' - Fracture, 5 deg, smooth, stepped, tight	[Symbolic Log]	Limestone 135.0-134.2' - moderate yellowish brown, (10YR 5/4), dense, moderate 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, trace very dark or black carbonaceous laminae seen at 133.0-134.2' No Recovery 134.2-135.0'	R20: 11 minutes	
145			4	136.3-136.7' - Fracture, 70-75 deg, rough, undulating, tight				
145			4	136.4' - Fracture, 5-10 deg, rough, undulating, tight				
145			>10	136.8' - Fracture, horizontal, rough, undulating, open				
145			NR	137.0' - Fracture, horizontal, rough, stepped to undulating to planar, open 137.2' - Fracture, 20 deg, rough, stepped, tight 137.4-137.55' - Fracture, 60 deg, rough, undulating, open				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 2.4 ft bgs on 5/03/07 START : 5/2/2007 END : 5/6/2007 LOGGER : D. Roraback

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-102.8	R21-NQ 5 ft 92%	57	2	137.7' - Fracture, horizontal, rough, undulating, open	Limestone 135.0-138.2' - variegated dusky yellow to grayish yellow to light gray to medium gray, (5Y 6/4 to 5Y 8/4 to N7 to N5), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids (<1/16") over 5% of rock surface, cavities up to 3-1/8" in length near bottom of section, some lined with black amorphous coating (possibly hematite), large (5") cavity at 135.5-135.8', poorly fossiliferous (mold and casts) Limestone 138.2-138.8' - yellowish gray to dusky yellow to olive gray, (5Y 7/2 to 5Y 3/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), laminated, voids rare to absent, rare cavities (<1/16-1/8" diameter) No Recovery 138.8-140.0' Limestone 140.0-141.9' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine to fine grained, strong HCl reaction, very weak to medium strong (R1 to R3), voids to 1/16" over <1% of rock surface, cavities (3/8"x1/8"x3/16") rare 141.9-142.9' - moderate olive brown, (5Y 4/4), fine grained, moderate HCl reaction, weak to very weak (R2 to R1), voids to 1/16" over 35-40%, cavities to 3/4" over <5%, some fossils (molds/casts) No Recovery 142.9-145.0' Limestone 145.0-145.1' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, extremely weak (R0), friable 145.1-147.9' - Same as 140.0-141.9' 147.9-149.2' - variegated very light gray to yellowish gray, (N8 to 5Y 7/2), strong HCl reaction, extremely weak to very weak (R0 to R1), very thinly laminated with possibly carbonaceous or clayey material from 147.9-148.35', voids (<1/16") over 2-3% rock, cavities rare to absent, trace fossil echinoderms 149.2-149.6' - dusky yellow, (5Y 6/4), mild HCl reaction, medium strong (R3), voids (<1/16") over 1-2%, cavities (1/16-1/8") rare, fossils rare to absent No Recovery 149.6-150.0' Bottom of Boring at 150.0 ft bgs on 5/6/2007	SC-4 collected at 146.7-147.3' R21: 11 minutes Bottom of boring at 150.0' below ground surface	
			0	138.0' - Fracture, horizontal, smooth, undulating, open			
			4	138.2' - Fracture, horizontal, smooth, undulating, tight			
			3	138.3' - Fracture, 5 deg, smooth, undulating, tight			
			2	138.75' - Fracture, horizontal, smooth, planar, tight			
			NR	138.8' - Fracture, horizontal, smooth, planar, tight			
150	150.0			140.1' - Fracture, 5-10 deg, smooth, planar, tight			
-107.8				140.3-140.5' - Fracture, 45-50 deg, smooth, planar, tight			
				140.55, 140.65' - Fractures (2), horizontal, rough, planar, open			
				141.2' - Fracture, 5-10 deg, rough, undulating, tight			
				141.3' - Fracture, 0-5 deg, rough, stepped, open			
				141.8' - Fracture, horizontal, rough, undulating, open			
				141.9-142.2' - Fracture zone, angular to subangular rock fragments			
				142.4, 142.6' - Fractures (2), horizontal, rough, undulating, open			
				142.7' - Fracture, horizontal, rough, undulating, tight			
				145.1' - Fracture, horizontal, rough, undulating, open			
				145.9-146.1' - Fracture, 60 deg, rough, undulating, tight			
				147.3' - Fracture, horizontal, rough, undulating, semi tight			
				147.7' - Fracture, 0-5 deg, rough, undulating, tight			
				147.8' - Fracture, horizontal, rough, undulating, open			
				147.9-147.8' - Fracture zone, horizontal, rough, undulating			
				148.1' - Fracture, horizontal, rough, stepped, open			
				148.2, 148.9, 149.27, 149.3' - Fractures (4), horizontal, rough, undulating, open			
				149.4' - Fracture, horizontal, smooth, planar, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 6.0 ft bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
42.5			6"-6"-6" (N)	See B-30 for shallow soils; no logging/coring until 25.0'		0.0-10.0': Drilled with 5-7/8" tricone bit with no sampling or coring (EZ Mud)
5 37.5						Driller's Remark: Encountered water at 6.0'
10 32.5						Driller's Remark: Hole has deviated at 10.0' 10.0-25.0': 5" (PW) surface casing installed with rock devil bit and cleaned out with 3-7/8" tricone bit 10.0-15.0': 30 minutes to drill
15 27.5						15.0-20.0': 14 minutes to drill
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 6.0 ft bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
22.5						20.0-25.0': 4 minutes to drill
25	25.0					
17.5		1.2	SS-1	9-19-22 (41)		Sandy Silt (ML) 25.0-26.2' - grayish orange, (10YR 7/4), moist, hard, very fine to coarse grained, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 35% very fine to coarse sand-sized, 10% fine gravel-sized, all carbonate
	26.5					
30	30.0					
12.5		1.0	SS-2	22-16-27 (43)		Sandy Silt (ML) 30.0-31.0' - Same as 25.0-26.2'
	31.5					
35						Driller's Remark: Firm drilling, no chatter
7.5						Driller's Remark: Easier drilling, no chatter
						Driller's Remark: Trip out to begin HQ rock coring
						Begin Rock Coring at 34.0 ft bgs See the next sheet for the rock core log
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 6.0 ft bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
34.0	R1-HQ 3.5 ft 100%	90	1	34.05' - Fracture, <5 deg, rough, undulating, tight	Limestone 34.0-37.5' - moderate yellowish brown, with lineations of gray to dark yellowish brown, (10YR 5/4, 10YR 4/2), fine grained, mild HCl reaction, weak (R2), 1/16-1/8" pebbles in matrix where gray, 20% 1/16" voids, crumbles to silt to sand-sized particles from 34.1-34.3', cavities up to 3/4" from 35.9-37.5'	Rock coring begins at 34'	
35 7.5			0	34.1-34.3' - Fracture, sandy silt			
			0				
			1	36.5' - Fracture, 0-20 deg, rough, undulating			
37.5	R2-HQ 5 ft 66%	57	0		37.5-40.8' - Same as 34.0-37.5' except dark yellowish brown, (10YR 4/2), 30% voids up to 1/16" and 2" x 1" cavities at 37.7', extremely weak (R0) at 38.5-39.3', voids up to 3/16" from 40.3-40.8'	R1: 13 minutes	
			2	38.5-39.3' - Fracture zone, bounded by horizontal to 20 deg rough and undulating surfaces			
			2	39.4' - Fracture, rough, undulating, tight			
40 2.5			0	40.2' - Fracture, 30 deg, rough, undulating			
			NR				
42.5	R3-HQ 5 ft 80%	65	0		No Recovery 40.8-42.5'	R2: 2 minutes	
			0				
45 -2.5			0	45.0' - Mechanical break			
			2	45.8' - Fracture, 50 deg, rough, undulating, tight to healed			
			NR	46.1' - Fracture, 50 deg, rough, undulating, tight to healed			
47.5	R4-HQ 5 ft 84%	75	1	47.8' - Fracture, 75 deg, rough, undulating, stepped	Limestone 47.5-51.7' - dusky yellow to moderate yellowish brown, (5YR 6/4 to 10YR 5/4), fine grained, moderate HCl reaction, strong (R4), very weak (R1) from 48.5-48.3', 15-25% 1/16" voids decreasing to 5-10% below 49.5'	R3: 7 minutes	
			3	48.5, 48.8' - Fractures (2), horizontal, smooth, undulating, open			
			0	49.45' - Fracture, horizontal, smooth, undulating, open			
50 -7.5			1	50.6' - Mechanical break, 10 deg, rough, undulating, tight			
			NR				
52.5			3	53.0-54.4' - Fracture or bedding plane, horizontal, rough, undulating, multiple fractures	No Recovery 51.7-52.5'	SC-1 collected at 50.6-51.7' R4: 8 minutes	
						Limestone 52.5-53.0' - Same as 47.5-51.7' except with 1/16" voids increasing to 25%	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
55 -12.5	R5-HQ 5 ft 80%	50	6				Limestone 53.0-54.1' - dusky yellow to moderate yellowish brown, (5YR 6/4 to 10YR 5/4), extremely weak (R0), increasing to very weak (R1) with depth, horizontal laminations/bedding planes 1/16" thick, often fractured along organic rich zones, some infilled with silts and clays 54.1-56.5' - Same as 52.5-53.0' except with increasing voids to 30-40% with depth No Recovery 56.5-57.5' Limestone 57.5-60.3' - Same as 52.5-53.0' except strong HCl reaction, few organic laminations (minor) throughout, extremely weak to very weak (R0 to R1) and easily broken at 59.1-60.2, 60.3-61.0' - light olive gray, (5YR 5/2), very fine grained, strong HCl reaction, strong (R4), 1-2" angular fragments, 5% voids (1/16") 61.0-62.1' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, strong (R4), 5% voids (1/16") increasing with depth to 25% with depth, several 1/4" voids No Recovery 62.1-62.5' Limestone 62.5-67.5' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, medium strong (R3), shallow 1/16" voids over 5%, some irregular black laminations, dark yellowish brown (10YR 4/2) and extremely weak (R0) at 65.8-65.9', extremely weak (R0) to weak (R1) from 65.9-67.5', increasingly competent with depth 67.5-71.5' - dark yellowish brown, (10YR 4/2), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, increasing % of 1/16" voids (up to 40%) at 68.7-71.7', fine organic laminations at 69.4' and 70.3' 71.5-72.5' - Same as 67.5-71.5' except light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2), small 1/16" voids decrease to 5%, also several 1/2" voids to cavities	Driller's Remark: Softer drilling at 52.5-57.5' compared to previous R5: 3 minutes Driller's Remark: Loss of water at 61.0' R6: 13 minutes SC-2 collected at 63.6-64.9' R7: 4 minutes R8: 10 minutes	
			0	55.65' - Mechanical break, 10 deg, smooth, planar					
			1	56.4' - Mechanical break, 60 deg					
			NR						
	60 -17.5	R6-HQ 5 ft 92%	47	2	57.6-57.9' - Fracture or bedding plane, horizontal, multiple fractures/bedding planes, infill of clay along one fracture				
				3	58.5' - Fracture, 40 deg, rough, undulating, low angle, fracture through undulating wavy zone (3/4") of dark black organics (lignite) organics clayey and "forky" on fracture surface				
				5	59.3-60.1' - Bedding plane, multiple fractures				
				2	60.1' - sharp discontinuity between silty limestone material with organic and medium dark gray dense limestone				
				1	60.4-60.9' - Fracture, limestone fragments				
				NR	60.9' - Fracture or mechanical break, 75 deg, rough, undulating, semi-planar				
65 -22.5	R7-HQ 5 ft 100%	43	1	60.9' - Fracture, 60 deg, rough, undulating					
			2	63.0' - Mechanical break, vertical, rough, non planar					
			0	63.6' - Fracture, 35 deg, rough, undulating, semi-planar					
			0	63.7' - Mechanical break, horizontal, rough, undulating					
			1	65.8' - Fracture, horizontal, carbonate silt, friable					
			1	66.8' - Fracture, 50 deg, rough, undulating, semi-planar fracture					
70 -27.5	R8-HQ 5 ft 100%	70	2	67.5-67.7' - Fracture zone, horizontal, rough, undulating					
			3	68.3' - Fracture, horizontal					
			1	68.8, 68.95, 69.3, 70.0' - Bedding plane, horizontal, organics					
			1	69.9' - Fracture, 10 deg, rough, undulating, open					
			1	70.9' - Fracture, friable, open					
			2	71.5-71.7' - Fracture zone, friable					
			1	72.9' - Fracture, 30 deg, rough, undulating, includes several 1/2 to 1" elongated cavities					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 6.0 ft bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
75 -32.5	R9-HQ 5 ft 100%	70	0		Limestone 72.5-78.0' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), shallow 1/16" voids over 5%, 1/2" to 1" cavities, numerous small (1/8") casts/molds, extremely weak (R0) silt-sized carbonate material and trace organics at 74.6-75.3', fewer large cavities at 75.3-77.5' 78.0-78.5' - moderate yellowish brown, (10YR 5/4), moist, mild HCl reaction 78.5-82.1' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, medium strong (R3), 20% 1/16" voids, fossiliferous with some cavities up to 1/2" No Recovery 82.1-82.5' Limestone 82.5-86.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), 25% 1/16" voids, many up to 1/4" cavities and 1" cavities with mold at 83.8' No Recovery 86.6-87.5' Limestone 87.5-88.7' - Same as 82.5-86.6' except yellowish gray, (5Y 7/2), with voids up to 1/4" diameter over 10% and many up to 3/4" cavities (still 10% small voids), rock becomes fractured at 88.5', fragments covered with fine grained material, no sediment infilling in molds/cavities No Recovery 88.7-93.5'	R9: 9 minutes	
			4	74.6, 74.8, 75.1, 75.3' - Fractures (4), horizontal, rough, undulating, open			
			2	75.7-75.9' - Fractures (2), horizontal and vertical, rough, undulating to stepped, silt-sized infilling			
			3	76.6' - Fracture, 50 deg, rough, undulating			
77.5			3	77.3' - Fracture, horizontal and 60 deg, rough, stepped			
			1	77.5' - Fracture, horizontal, smooth, undulating			
			0	77.6' - Fracture, horizontal, smooth, undulating, tight			
80 -37.5	R10-HQ 5 ft 92%	53	0	78.0-78.5' - angular fragment 1/2" with fines infilled			
			2	79.2' - Fracture, 30 deg, rough, undulating, tight, 1/16" relief			
			1	80.0-80.2' - Mechanical break			
			NR	80.9' - Fracture, 20 deg, rough, undulating, 3/8" relief			
				81.4, 81.9' - Fractures (2), horizontal and 40 deg, rough, angular fragments to 1-1/2", open			
			2	83.1' - Fracture, 75 deg, rough, undulating			
			0	83.2' - Fracture, 10 deg, rough, undulating, organics			
85 -42.5	R11-HQ 5 ft 82%	53	3	84.8, 85.1' - Fractures (3), rough, undulating, 1/16" thick, organic laminations			
			3	84.9' - Fracture, 30 deg			
			NR	86.0' - Fracture, 75 deg, rough, undulating, minor black/gray staining on fracture surface			
				86.3, 86.4' - Fractures (2), horizontal, rough, undulating			
			1	87.7' - Fracture, horizontal, rough, undulating			
			2	88.5' - Fracture, horizontal, rough, undulating, iron staining			
			NR	88.6' - Fracture, horizontal, rough, undulating			
90 -47.5	R12-HQ 5 ft 24%	13	NR				
			NR				
				93.5-94.5' - Fracture, traces of lignite			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/12/07 START : 6/12/2007 END : 6/13/2007 LOGGER : D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
95 -52.5	R13-HQ 5 ft 80%	45	>10 0 3	94.7' - Fracture, 10 deg, rough, undulating, open 96.0, 96.2, 96.3' - Fractures (3), horizontal and 50 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%, fossiliferous with voids/cavities from 1/4" to 1/2" 97.5-100.2' - Same as 93.5-97.5' except 1/16" voids increase to 15%, unconsolidated, silt-sized, carbonate material at 100.0-100.2' No Recovery 100.2-105.1'	Driller's Remark: Logged hole before starting at 93.5' (6 inches past where previous run ended) 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				
100 -57.5	R14-HQ 5 ft 54%	28	1 2 5	98.9' - Fracture (2), 40 deg and vertical, rough, undulating 99.4-100.0' - Fracture zone, horizontal and vertical, non planar, friable			
102.5		NR					
105 -62.5	R15-HQ 5 ft 48%	22	NR >10 >10 0	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 1/16" fossil mold, extremely weak (R0) and friable at 105.8-106.3', very weak (R1) and friable with several elongate fossil molds at 106.3-108.7' 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 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' except with several elongate fossils	R15: 2 minutes R16: 6 minutes	
107.5		2					
110 -67.5	R16-HQ 5 ft 100%	38	2 4 >10 >10				
112.5							
					Bottom of Boring at 112.5 ft bgs on 6/13/2007		

LOG OF BORING NO. B-31

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
						DESCRIPTION		
	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. Picture mislabeled: Labeled S-2 in pictures instead of S-3.
	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 HCl.	sp	
	4	S-3	3-5 3 (8)	0.8		3.0-4.5' As above except with a root (organic), loose.	sp	
	6	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	
	8	S-5	3-3 4 (7)	0.7		6.0-7.5' As above except grayish brown (5YR 3/2), loose.	sp	
	10	S-6	4-4 6 (10)	0.8		7.5-9.0' As above except grayish orange pink (5YR 7/2), loose.	sp	
	12	S-7	4-6 7 (13)	0.9		9.0-13.5' As above except medium dense.	sp	
	14	S-8	6-7 8 (15)	0.9			sp	
		S-9	5-8 8 (16)	1.0			sp	
		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 HCl.	sp	
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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		USCS SYMBOL	REMARKS
						SURFACE EL: 43.4			
						DESCRIPTION			
	16	S-11	4-6 8 (14)	0.9		16.5-21.0' As above except pale yellowish brown (10YR 6/2), weak reaction to 1N HCl. 21.0-25.5' As above except no reaction to 1N HCl. 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. 27.0-30.0' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCl.		sp	
		S-12	4-8 7 (15)	0.9				sp	
	18	S-13	7-8 9 (17)	0.9				sp	
		S-14	8-9 12 (21)	0.9				sp	
	22	S-15	6-7 7 (14)	1.1				sp	
		S-16	6-6 6 (12)	0.9				sp	
	24	S-17	8-6 7 (13)	1.0				sp	
		S-18	8-8 9 (17)	0.9				sp	
	28	S-19	7-7 9 (16)	1.3				sp	
			8-10					sp	

DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:	GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring	NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offest Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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
						DESCRIPTION		
	30	S-20	9 (19)	1.1		30.0-31.5' As above except pale yellowish brown (10YR 6/2) to light gray (N7).	sp	
		S-21	7-9 9 (18)	1.4		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	
	32	S-22	8-9 10 (19)	1.0		33.0-34.5' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	
	34	S-23	8-9 11 (20)	1.3		34.5-37.5' As above except very pale orange (10YR 8/2) to grayish orange (10YR 7/4), no reaction to 1N HCl.	sp	Driller switches to AWJ rods.
	36	S-24	6-6 3 (9)	1.0			sp	
		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.	sp	
	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 medium	sp	Driller switched back to NWJ rod.	
DATE STARTED: 10/15/09					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800		NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.	
DATE COMPLETED: 10/18/09					GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300			
FIELD GEOLOGIST: WDS					DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			
CHECKED BY: JLO								
APPROVED BY:					DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500	
DRILLING CO.: HUSS								

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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	
						DESCRIPTION			
	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	S-33	5-5 6 (11)	0.8		48.0-54.0' As above except pale yellowish brown (10YR 6/2), medium dense.	sp		
	50	S-34	5-7 7 (14)	0.9			sp		
	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	S-38	4-5 5 (10)	1.5		55.5-58.5' As above except with medium dark gray (N4).	sp		
	58	S-39	4-5 5 (10)	1.5			sp		
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.	
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody					RIG: Failing 1500

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 43.4			DESCRIPTION
		S-40	5-5 6 (11)	1.3		58.5-61.5' As above except very pale orange (10YR 8/2) to grayish orange (10YR 7/4).	sp		
	60	S-41	4-5 5 (10)	1.3		61.5-63.0' As above except grayish orange (10YR 7/4) with light gray (N7) bands.	sp		
	62	S-42	4-5 5 (10)	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'.
	64	S-43	5-5 6 (11)	1.1			sp		
	66	S-44	5-5 6 (11)	1.0		66.0-67.5' As above except with medium light gray (N6) bands.	sp		
	68	S-45	4-4 5 (9)	1.2		67.5-69.0' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2).	sp		
	70	S-46	3-3 2 (5)	1.4		69.0-70.5' As above except with medium gray (N5) bands.	sp		
	72	S-47	3-3 3 (6)	1.5		70.5-72.0' As above except very pale orange (10YR 8/2) with medium gray (N5) bands.	sp		
		S-48	3-3 4 (7)	1.2			sp		
		S-49	2-3 2 (5)	1.5		72.0-73.5' As above except with fine black (N1) grains.	sp		

DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:	GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring	NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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		USCS SYMBOL	REMARKS
						SURFACE EL: 43.4			
						DESCRIPTION			
-30.1	74	S-50	2-1 1 (2)	0.1	/ / / / /	73.5'		ch	
-31.6	76	S-51	1-1 1 (2)	1.3	. . . . .	75.0'		sp
	78	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
	80	S-53	1-2 2 (4)	1.5	. . . . .	79.5-84.0' As above except moderate yellowish brown (10YR 5/4), trace silt.		sp
	82	S-54	1-1 1 (2)	1.3	. . . . .			sp
	84	S-55	2-2 1 (3)	1.5	. . . . .			sp
	86	S-56	2-2 1 (3)	1.5	. . . . .			sp
		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
		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 STARTED: 10/15/09					GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800			NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.	
DATE COMPLETED: 10/18/09					GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300				
FIELD GEOLOGIST: WDS					DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring				
CHECKED BY: JLO					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31











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
						DESCRIPTION		
	88	S-59	1 (1)	1.5		88.5-90.0' As above except moderate yellowish brown (10YR 5/4).	sp	
		S-60	WOH- WOH WOH (0)	1.5		90.0-91.5' As above except pale yellowish brown (10YR 6/2), trace silt.	sp	
	90	S-61	1-2 2 (4)	1.3		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	
	92	S-62	1-1 2 (3)	1.2		93.0-94.5' As above except moderate yellowish brown (10YR 5/4), trace silt, loose.	sp	
	94	S-63	3-3 4 (7)	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-64	WOH- WOH WOH (0)	1.5		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-65	WOH- WOH WOH (0)	0.9			sp	
	100	S-66	WOH- WOH 1 (1)	1.0		99.0-100.5' As above except moderate yellowish brown (10YR 5/4) and medium light gray (N6), trace silt, medium dense.	sp	
		S-67	5-7 8 (15)	1.5			sp-sm	Water level 10/17/09 @ 0750 0.0'
-57.1	102	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-	

DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:	GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring	NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500






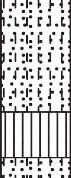




LNP- Offest Boring Program

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
						DESCRIPTION		
		S-69	2-2 5 (7)	1.0			sm	
	104	S-70	3-5 6 (11)	1.0		103.5-108.5' As above except moderate yellowish brown (10YR 5/4).	sp-sm	
	106	S-71	3-7 8 (15)	0.9			sp-sm	
	108	S-72	3-6 5 (11)	0.9			sp-sm	
-65.1		S-73	1-2 3 (5)	1.2		108.5-109.5' POORLY GRADED SAND with CLAY (sp-sc), fine grained sand, subrounded to rounded, high plasticity, high dry strength, slow dilatancy, medium toughness, no odor, no reaction with 1N HCl, no cementation, homogeneous, dark greenish gray (5GY 4/1) and moderate yellowish brown (10YR 5/4), soft.	sp-sc	
-66.1	110	S-74	1-2 2 (4)	1.2		109.5'-114.0' FAT CLAY with SAND (ch), high plasticity, high dry strength, slow dilatancy, high toughness, no odor, wet, mottled, dark greenish gray (5GY 4/1), sand- subrounded, spherical, moderate yellowish brown (10YR 5/4), very soft.	ch	
	112	S-75	WOH-2 2 (4)	1.5			ch	
	114	S-76	WOH- WOH WOH (0)	1.5		114.0-118.0' As above except medium dark gray (N4).	ch	Advanced another 6" before helper stopped rod.
		S-77	WOR- WOR WOR (0)	1.5			ch	Shortened sampled due to previous test. Driller sets casing to 115.0'.
	116	S-78	WOR- WOR WOR (0)	1.5				
DATE STARTED: 10/15/09		GWL: DEPTH: 6.1'		DATE/TIME: 10/16/09 @ 0800		NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.		
DATE COMPLETED: 10/18/09		GWL: DEPTH: 4.9'		DATE/TIME: 10/18/09 @ 1300				
FIELD GEOLOGIST: WDS		DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring						
CHECKED BY: JLO		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
APPROVED BY:								
DRILLING CO.: HUSS								

LOG OF BORING NO. B-31

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	
						DESCRIPTION			
-74.6	118	S-79	WOR- WOR WOR (0)	1.3			ch		
		S-80	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 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).	sp-sm		
	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		
	126	S-84	WOR- WOR WOR (0)	0.5		124.5-127.0' As above except very pale orange (10YR 8/2).	sp-sm		
-83.6	127	S-85	WOR- WOR WOR (0)	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.	ml		
-84.1	128	S-86	WOR- WOR WOR (0)	0.6		127.5-129.0' POORLY GRADED SAND with SILT as at 124.5-127.0'.	sp-sm		
	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 STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:				GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring			NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.		
DRILLING CO.: HUSS				DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500		


LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-31

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	USCS SYMBOL	REMARKS
						SURFACE EL: 43.4			DESCRIPTION
-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	<p>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'.</p> <p>10-18-09, GWL at 1.5 bgs at 0800.</p> <p>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 (135.5-140') Driller Notes: circulation loss at 137.0'.</p> <p>Run-3: 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%</p> <p>Run-4: Drilling Pressure: 350 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 11min 9sec</p>
	134	R-1	78% (39%)	1.8		<p>TOP OF AVON PARK FORMATION</p> <p>132.4-132.7' DOLOMITE, degraded, fine grained, medium to high plasticity, slow dilatancy, low toughness, no odor, moist, strong reaction to 1N HCl, firm consistency, homogeneous, weak cementation.</p> <p>132.7-133.8' DOLOMITE, soft, moderately weathered, unfractured, yellowish gray (5Y 8/1), thick bedded, strong reaction to 1N HCl.</p> <p>133.8-135.0' DOLOMITE, moderately hard, very slightly weathered, laminated, strong reaction to 1N HCl when powdered, yellowish gray (5Y 8/1), very slightly fractured (bedding planes).</p> <p>135.0-135.5' DOLOMITE, soft to moderately soft, severely weathered, homogeneous, weak reaction to 1N HCl, yellowish gray (5Y 8/1), intensely fractured.</p> <p>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).</p>		
	136	R-2	100% (36%)	5.0		<p>137.2-140.2' DOLOMITE, moderately hard, moderately weathered, pitted, vuggy (vugs filled with severely weathered dolomite-yellowish gray (5Y 7/2)), moderately to intensely fractured, light gray (N7), thinly laminated.</p>		
	138	R-3	98% (50%)	4.9		<p>140.2-141.2' DOLOMITE, hard, fresh, strong reaction to 1N HCl, very light gray (N8), very slightly fractured, thinly laminated.</p> <p>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).</p> <p>143.2-145.5' DOLOMITE, hard, very slightly fractured (horizontal fracture at 143.9'), weak reaction to 1N HCl, moderate reaction when powdered, laminated, yellowish gray (5Y 8/1).</p>		
	142					<p>145.5-147.8' DOLOMITE, soft to moderately soft, slightly fractured (horizontal), weak reaction to 1N HCl, moderate to strong reaction when powdered, very thinly laminated, light olive gray (5Y 6/1) with</p>		
144								
146								
DATE STARTED: 10/15/09		GWL: DEPTH: 6.1'		DATE/TIME: 10/16/09 @ 0800		NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.		
DATE COMPLETED: 10/18/09		GWL: DEPTH: 4.9'		DATE/TIME: 10/18/09 @ 1300				
FIELD GEOLOGIST: WDS		DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring				RIG: Failing 1500		
CHECKED BY: JLO		DRILLER: Eddie Palmer		HELPER: Chad/Cody				
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offest Boring Program PROJECT NO. 07-3935

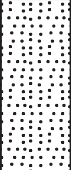
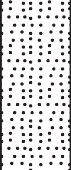
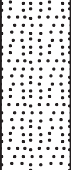



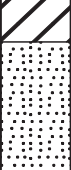
LOG OF BORING NO. B-31

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	
						DESCRIPTION			
	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: 10/15/09				GWL: DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800				NOTES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.	
DATE COMPLETED: 10/18/09				GWL: DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300					
FIELD GEOLOGIST: WDS				DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3Coring					
CHECKED BY: JLO				DRILLER: Eddie Palmer HELPER: Chad/Cody				RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	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					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	
		S-2	5-6 9 (15)	0.9				
	3						sp	
		S-3	5-7 6 (13)	0.8				
	4.5						sp	
38.3		S-4	3-2 2 (4)	1.2		4.7-6.0' CLAYEY SAND (sc), 60% sand, 40% silt, sand-fine grained, subrounded to rounded grains, low plasticity, medium dry strength, slow dilatancy, low toughness, light gray (N7), with dark greenish gray (5G 4/1) to greenish black (5GY 2/1)-possible lignite pocket, no odor, no reaction to 1N HCl, soft.	sp sc	
	6						ch	
		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.	ch	
	7.5						ch	
		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 HCl (mainly few calcareous pieces, coarse sand size), medium stiff.	ch	
	9						sp	
34.0		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 HCl, medium dense.	sp	
	10.5						sp	
						DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:		NOTES: Used NWJ rods for SPT sampling. RIG: Failing 1500
						GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody		
		DRILLING CO.: HUSS						

LNP- Offset Boring Program

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		USCS SYMBOL	REMARKS
						DESCRIPTION			
		S-8	4-6 6 (12)	0.8	[Dotted Profile]				
	12					Same as above.		sp	
		S-9	3-6 7 (13)	0.9					
	13.5					Same as above.		sp	
		S-10	4-5 7 (12)	1.1					
	15					Same as above.		sp	
		S-11	4-5 7 (12)	1.0					
	16.5					Same as above except with very fine grained black grains, loose.		sp	
		S-12	3-6 4 (10)	1.1					
	18					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	
		S-13	3-4 6 (10)	0.9					
	19.5					Same as above except medium dense.		sp	
		S-14	2-5 8 (13)	1.0					
	21					Same as above except yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2).		sp	
		S-15	4-5 8 (13)	0.9					
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			NOTES: Used NWJ rods for SPT sampling.	
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	

LNP- Offset Boring Program PROJECT NO. 07-3935

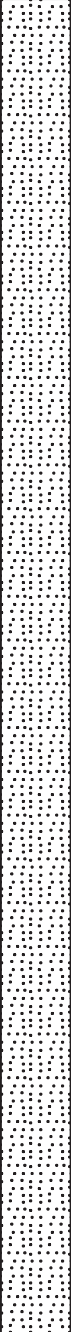
LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	22.5	S-16	4-4 7 (11)	1.2	[Dotted Profile]	Same as above.	sp	
	24	S-17	4-5 7 (12)	1.1		Same as above.	sp	
	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 (3)	1.4		Same as above.	sp	
	31.5	S-22	1-1 1 (2)	1.4		Color change at 31.3' to yellowish gray (5Y 8/1), moist, not saturated as above. Same as above.	sp	
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:						GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			NOTES: Used NWJ rods for SPT sampling. RIG: Failing 1500
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			

LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	33					Same as above.	sp	Water level 11/4/09 @ 0745 6.5'. NOTE: JLO observes some sample falling out of spoon when brought up.
		S-23	1-1 1 (2)	1.3		Same as above.	sp	
	34.5					Same as above.	sp	
		S-24	1-1 WOR (1)	1.4		POORLY GRADED SAND (sp), fine grained, well sorted, subangular to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), weak to moderate reaction to 1N HCl, very loose.	sp	
	36					Same as above except no reaction to 1N HCl.	sp	
		S-25	2-1 1 (2)	1.5		Same as above.	sp	
	37.5					Same as above.	sp	
		S-26	1-1 1 (2)	1.5		Same as above.	sp	
	39					Same as above except with very fine grained black grains (10-15%).	sp	
		S-27	2-1 1 (2)	1.3		Same as above.	sp	
	40.5				Same as above.	sp		
		S-28	WOH- WOH 1 (1)	1.5	Same as above.	sp		
	42				Same as above.	sp		
		S-29	1-WOH WOH (0)	1.5	Same as above.	sp		
	43.5				Same as above.	sp		

DATE STARTED: 11/3/09
 DATE COMPLETED: 11/5/09
 FIELD GEOLOGIST: JLO
 CHECKED BY: WDS
 APPROVED BY:
 DRILLING CO.: HUSS

GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745
 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745
 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring
 DRILLER: Eddie Palmer HELPER: Chad/Cody

NOTES: Used NWJ rods for SPT sampling.
 RIG: Failing 1500

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
		S-30	WOR- WOR WOR (0)	1.0				
	45						sp	
		S-31	WOR- WOR WOR (0)	1.3				
	46.5						ch	
-3.5						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	
-3.8		S-32	3-5 5 (10)	1.3				
-4.5						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	
-4.8							sp-sc	
	48							
		S-33	5-5 5 (10)	1.5				
-5.7						47.5-47.8' FAT CLAY (ch) as at 46.5-46.8'.	sp	
	49.5							
		S-34	2-6 2 (8)	1.5				
	51					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). 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 HCl, loose, trace very fine grained black grains.	sc	
-8.0								
	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.	sp	
-8.9								
	52.5					51.9-53.2' POORLY GRADED SAND (sp), fine 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 HCl, medium dense.		
		S-36	3-4 8 (12)	1.5				
-10.2						53.2-54.9' CLAYEY SAND (sc) as at 51-51.9'.	sc	
	54							
		S-37	6-7 7	1.3				
DATE STARTED: 11/3/09				GWL: DEPTH: 6.5'		DATE/TIME: 11/4/09 @ 0745		NOTES: Used NWJ rods for SPT sampling.
DATE COMPLETED: 11/5/09				GWL: DEPTH: 8.7'		DATE/TIME: 11/5/09 @ 0745		
FIELD GEOLOGIST: JLO				DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring				
CHECKED BY: WDS				DRILLER: Eddie Palmer				RIG: Failing 1500
APPROVED BY:				HELPER: Chad/Cody				
DRILLING CO.: HUSS								

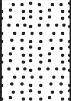
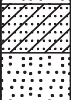











LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS	
						DESCRIPTION			
-11.9			(14)						
	55.5	S-38	2-3 5 (8)	1.5		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		
	57					Same as above.	sp		
	58.5	S-39	1-2 3 (5)	1.2		Same as above except medium bluish gray (5B 5/1) to greenish gray (5G 6/1).	sp		
	60	S-40	1-5 4 (9)	1.4		Same as above.	sp		
	61.5	S-41	1-5 7 (12)	1.0		Same as above except light olive gray (5Y 6/1).	sp		
	63	S-42	3-7 9 (16)	1.0		POORLY GRADED SAND (sp), fined grained, subrounded to 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.	sp		
	64.5	S-43	2-6 6 (12)	0.8		Same as above except yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), loose.	sp		
		S-44	2-3 4 (7)	1.3					
DATE STARTED: 11/3/09		GWL: DEPTH: 6.5'		DATE/TIME: 11/4/09 @ 0745		NOTES: Used NWJ rods for SPT sampling.			
DATE COMPLETED: 11/5/09		GWL: DEPTH: 8.7'		DATE/TIME: 11/5/09 @ 0745					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						RIG: Failing 1500	
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody					
APPROVED BY:									
DRILLING CO.: HUSS									

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	66					66.0-66.7' Same as above.	sp	
-23.7		S-45	5-10 15 (25)	1.3		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 HCl, medium dense.	sc	
-24.1						67.1-67.5' POORLY GRADED SAND (sp) as above.	sp	
-24.5	67.5	S-46	14-23 33 (56)	0.6		67.5-69.7' CLAYEY SAND (sc) as above except yellowish gray (5Y 8/1) to light olive gray (5Y 6/1).	sc	
	69					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.	ch	
-26.7		S-47	13-9 7 (16)	1.5		Same as above.	ch	
	70.5	S-48	13-50/3 (50)	0.75			ch	No sample 71.25-72.0'.
	72					72.0-72.3' FAT CLAY (ch) as above.	ch	
-29.3		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), severely weathered, soft to very soft, moderate to strong reaction to 1N HCl, silty texture.		TOP OF AVON PARK 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.		Run-1: Drilling Pressure: 200-250 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 32min 30sec Circ. Loss: None
	76.5					75.5-76.1' DOLOMITE, severely 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 toughness.		
						76.1-80.0' DOLOMITE, moderately hard, slightly weathered.		
DATE STARTED: 11/3/09		GWL: DEPTH: 6.5'		DATE/TIME: 11/4/09 @ 0745		NOTES: Used NWJ rods for SPT sampling.		
DATE COMPLETED: 11/5/09		GWL: DEPTH: 8.7'		DATE/TIME: 11/5/09 @ 0745				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								






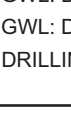

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS	
						DESCRIPTION			
	78	R-1	98% (16%)	4.9		moderately fractured (vertical fracture 77-79.5'), pitted, few vugs, thick bedded, no fossils, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 221 Engine RPM: 1400-1500 Drill Time: 20min 9sec Circ. Loss: None	
	79.5					80.0-85.0' DOLOMITE, as above except unfractured.			
	81								
	82.5	R-2	90% (78%)	4.5		83.5-84.4' Soft zone, intensely fractured.		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.	
	84								
	85.5					85.0-87.7' DOLOMITE, moderately hard, strong reaction to 1N HCl when powdered, medium bedded, slightly to moderately weathered in zones/bands, pitted, some vugs, moderately fractured (horizontal-bedding planes only), medium light gray (N6).			
	87	R-3	100% (70%)	5.0					
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			NOTES: Used NWJ rods for SPT sampling.	
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody					RIG: Failing 1500


LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						SURFACE EL: 43.0			DESCRIPTION
	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).		Run-4: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 17min 8sec Circ. Loss: None
	90					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).		
	91.5	R-4	100% (54%)	5.0		94.5-95.0' Friable with very thin black organic lenses.		
	93					95.0-100.0' DOLOMITE same as 91.0-95.0'. 95.0-96.2' Vertical fracture, intensely fractured.		Run-5: Drilling Pressure: 250-300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 10min 55sec Circ. Loss: None
	94.5							
	96							
	97.5	R-5	100% (68%)	5.0				
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			NOTES: Used NWJ rods for SPT sampling. RIG: Failing 1500
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			

LNP- Offset Boring Program **PROJECT NO. 07-3935**

LOG OF BORING NO. B-33

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
-57.0	99					98.7-99.4' Intensely fractured.		
	100.5					BOTTOM OF BORING 100'		
	102							
	103.5							
	105							
	106.5							
	108							
	109.5							

DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTES: Used NWJ rods for SPT sampling.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-01	SHEET 1 OF 7
SOIL BORING 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
 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 : 9.5 ft bgs on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
43.4	0.0	1.1	SS-1	1-1-2 (3)	Topsoil 0.0-0.25' - 80-90% organics Poorly Graded Sand (SP) 0.25-1.1' - very light gray, white and light brownish gray, (N8, N9 and 5YR 6/1), dry to moist, very loose, very fine to fine grained, silica sand, 15% organics, trace nonplastic fines		
5 38.4	5.0	1.0	SS-2	2-3-4 (7)	Sandy Lean Clay (CL) 5.0-5.3' - mottled very light gray, grayish yellow, and dark yellowish orange, (N8, 5Y 8/4, and 10YR 6/6), 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 33.4	10.0	0.9	SS-3	3-5-6 (11)	Interbedded Poorly Graded Sand And Silt (SP-SM) 10.0-10.85' - very pale orange, pale yellowish brown, dark yellowish brown, (10YR 8/2, 10YR 6/2, 10YR 4/2), wet, medium dense, very fine to fine grained, 5-15% nonplastic fines, varies in beds		
15 28.4	15.0	1.0	SS-4	3-4-5 (9)	Poorly Graded Sand With Silt (SP-SM) 15.0-16.0' - pale yellowish brown, (10YR 6/2), wet, loose, very fine to fine grained, silica sand, 10% nonplastic fines		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-01	SHEET 2 OF 7
SOIL BORING 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
 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 : 9.5 ft bgs on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
23.4	20.0	1.1	SS-5	6-5-5 (10)	Silty Sand (SM) 20.0-21.05' - Same as 15.0-16.0' except 15-20% nonplastic fines		
	21.5						
25	25.0	0.9	SS-6	3-4-6 (10)	Poorly Graded Sand With Silt (SP-SM) 25.0-25.9' - very pale orange, pale yellowish brown, (10YR 8/2, 10YR 6/2), wet, loose, very fine to fine grained, silica sand, 7% nonplastic fines		
18.4	26.5						
30	30.0	1.1	SS-7	4-4-6 (10)	Silty Sand (SM) 30.0-31.05' - very light gray, (N8), moist to wet, loose, very fine to fine grained, silica sand, 15-20% nonplastic fines, trace organics		
13.4	31.5						
35	35.0	1.2	SS-8	2-2-2 (4)	Silty Sand (SM) 35.0-36.2' - Same as 30.0-31.05' except very loose		
8.4	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-01	SHEET 3 OF 7
SOIL BORING 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
 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 : 9.5 ft bgs on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
3.4	40.0	1.5	SS-9	3-5-5 (10)	[Symbolic Log Pattern]	Driller's Remark: Change in drilling at 44.5' (stiffer)
	41.5					
45	45.0	1.5	SS-10	5-8-9 (17)	[Symbolic Log Pattern]	
-1.6	46.5			Fat Clay (CH) 45.0-45.3' - yellowish gray, (5Y 8/1), moist, medium stiff, high plasticity, no to slow dilatancy, no HCl reaction 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 reaction, 1/2" lens of very fine fine silica sand at 46.5'		
	50.0			Fat Clay (CH) 46.4-46.5' - brownish gray, (5Y 8/1), moist to wet, medium stiff, high plasticity, no dilatancy, no HCl 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 up to 1/4" thick from 50.0-51.3' light bluish gray (5B 7/1), highly plastic, no HCl reaction		
50	55.0	1.5	SS-11	4-4-3 (7)	[Symbolic Log Pattern]	
-6.6	51.5					
55	55.0	1.5	SS-12	1-2-4 (6)	[Symbolic Log Pattern]	
-11.6	56.5			Silty Sand With Clay (SM) 55.0-56.5' - yellowish gray, (10YR), wet, loose, very fine to fine grained, 20-30% nonplastic to low plastic 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		
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-01	SHEET 4 OF 7
SOIL BORING 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
 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 : 9.5 ft bgs on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-16.6	60.0	1.4	SS-13	Interbedded Clayey Sand And Fat Clay (SC-CH) 60.0-60.6' - Same as 50.0-51.5 and 55.0-56.5' except 60% clayey sand (SC), mottled yellowish gray and 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 Soil (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) 61.0-61.4' - light olive gray, (5Y 5/2), wet, loose, fine grained, 20% nonplastic fine organics, 1/2" lens of sandy organic soil (OL) at 61.3-61.4' 25% fine silica sand, no HCl reaction No Recovery At 65.0'		Driller's Remark: Hard at 64.0' Switch to 2-7/8" tricone bit at 65.0'
61.5			3-4-6 (10)			
65	65.0	0.0	SS-14	50/0 (50/0")		
-21.6	65.0					
70	70.0	1.5	SS-15	22-16-19 (35)		
-26.6	71.5					
75	75.0	0.0	SS-16	50/0 (50/0")		
-31.6	75.0					
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-01	SHEET 5 OF 7
SOIL BORING 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
 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 : 9.5 ft bgs on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)		#TYPE				
-36.6	80.0	1.1	SS-17	4-46-50/1 (96/7")	Sandy Silt And Limestone Fragments (ML) 80.0-81.1' - grayish yellow, (5Y 8/4), wet, fine to 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 to very strong HCl reaction Begin Rock Coring at 81.0 ft bgs See the next sheet for the rock core log	Switch to rock coring at 81.0'	
	81.1						
85 -41.6							
90 -46.6							
95 -51.6							
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 on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
81.0	R1-NQ 5 ft 66%	17	3	81.1' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight		Limestone 81.0-84.3' - yellowish gray, (5Y 7/2), fine to coarse grained, strong HCl reaction, very weak (R1), voids to 1" (predominately <1/16") approximately 20% of core, fossiliferous (casts and molds) No Recovery 84.3-86.0'	Begin rock coring at 81.0' R1: 11 minutes Core run times not recorded below run R1
			>10	81.6' - Mechanical break or bedding plane, <5 deg, smooth, planar, open <1/16"			
			>10	82.5' - Mechanical break, <5 deg, rough, undulating, tight			
			1	82.5-82.7' - Fracture zone, <5 deg, fragments to 2", angular			
85 -41.6			NR	83.4' - Bedding plane, <5 deg, rough, undulating, open <1/16"			
86.0	R2-NQ 5 ft 100%	78	>10	83.6-84.0' - Fracture zone, horizontal, fragments from <1/8" to 2" angular to subangular			
			2	84.15' - Fracture, 70-80 deg, rough, undulating, tight			
			1	86.0-86.1' - Fracture zone, no visible orientation fragments to 1/2"			
			0	86.6' - Mechanical break, <5 deg, rough, undulating, tight			
90 -46.6								87.4' - Bedding plane, <5 deg, smooth, planar, open 1/2", fine infilling
			3	87.8' - Bedding plane, <5 deg, rough, planar, tight			
91.0	R3-NQ 5 ft 92%	35	5	88.0' - Bedding plane, <5 deg, rough, planar, open, <1/16"			
			3	90.0' - Fracture, <5 deg, rough, undulating, open, <1/16", fine infill			
			1	90.6, 90.8' - Fractures (2), 5-10 deg, rough, undulating, open, <1/16"			
			>10	91.15, 91.25' - Fractures (2), <5 deg, rough, undulating, open to 1/4"			
95 -51.6					91.5' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight		
			>10	91.8, 91.95, 92.1, 92.15' - Mechanical break or bedding plane (4), <5 deg, rough, undulating, open to 1/4"			
96.0	R4-NQ 5 ft 100%	33	NR	92.35-92.5' - Fracture or bedding plane, <5 deg, smooth, planar, fine infilling			
			1	93.75, 94.1' - Mechanical break (2), <5 deg, rough, undulating, tight			
			>10	94.5-95.6' - Fracture zone, no visible orientation, fragments to 2" angular, dark gray to black staining on some fragments			
			2	96.15' - Bedding plane, <5 deg, rough, undulating, open <1/16"			
100 -56.6					96.6-97.7' - Mechanical break, vertical, rough, undulating, tight		
			2	97.77' - Bedding plane, <5 deg, rough, undulating, tight			
101.0			2	98.5' - Fracture, 45-55 deg, rough, undulating, tight			
			2	98.8' - Fracture, 45-55 deg, rough, undulating, open 1/8"			
			2	99.6' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/8"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 12/3/07 START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -61.6	R5-NQ 5 ft 100%	100	0		Limestone 101.0-106.0' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" (predominately <1/16") over approximately 15% of core, trace organics 106.0-111.0' - Same as 101.0-106.0' except weak (R2), irregular wavy bedding from 106.5-107.45', fossiliferous zone from 107.7-108.7' with voids to 1/8" over 10-12% of the core	Water level = 9.5' below ground surface Total depth of boring is 111.0'	
			1	102.0' - Mechanical break, <5 deg, rough, undulating, tight			
			0				
			0				
			0				
110 -66.6	R6-NQ 5 ft 100%	57	1	106.3, 107.35, 107.6' - Mechanical break (3), <5 deg, rough, undulating, open 1/8"			
			2				
			1	108.45' - Fracture, 5-10 deg, rough, undulating, tight			
			1	109.15, 110.35' - Fractures (2), 20-30 deg, rough, undulating, tight			
			1				
					Bottom of Boring at 111.0 ft bgs on 12/3/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-02	SHEET 1 OF 4
SOIL BORING 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
 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 bgs on 11/30/07 START : 11/29/2007 END : 12/1/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
42.3	0.0	1.2	SS-1	2-3-3 (6)	Topsoil 0.0-0.15' - Poorly graded sand with organics Poorly Graded Sand With Silt (SP-SM) 0.15-1.15' - pale yellowish brown grading to dark yellowish brown, (10YR 6/2 to 10YR 4/2), moist, loose, fine grained, no HCl reaction, silica sand, trace to 10% nonplastic fines		
5 37.3	5.0	1.3	SS-2	4-3-32 (35)	Clayey Sand (SC) 5.0-5.75' - moderate yellowish brown to light greenish gray, (10YR 5/4 to 5G 8/1), moist, dense, fine grained, slow dilatancy, no HCl reaction, 30% medium to high plasticity fines, some organics Silt (ML) 5.75-6.3' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), moist, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5-10% very fine sand, carbonate materials, trace organics		Driller's Remark: Hard drilling at 6.0'
10 32.3	10.0	0.9	SS-3	3-4-50/3.5 (54/9.5")	Silt With Limestone Fragments (ML) 10.0-10.85' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, hard, nonplastic, high dilatancy, mild to moderate HCl reaction, 10% very fine sand, 50% limestone lenses (angular limestone fragments up to 1" diameter), trace black organic staining		Driller's Remark: Lost 50% circulation at 10.0' Driller's Remark: Hard drilling at 12.0'
15 27.3	15.0	0.3	SS-4	50/4.5 (50/4.5")	Silty Sand With Limestone Fragments (SM) 15.0-15.3' - Same as 10.0-10.85' except 34% nonplastic fines, 66% limestone fragments, no organics		Driller's Remark: Losing circulation, soft, possible void space at 14-14.5' Driller's Remark: Hard drilling, 100% circulation loss at 15.0'
20	20.0	0.0	SS-5	50/1.5 (50/1.5")	No Recovery 20.0-20.1'		Driller's Remark: Regaining some circulation at 17.5' Driller's Remark: Soft at 17.9-18.5', lost all circulation Driller's Remark: Light drill chatter at 18.0' Driller's Remark: Hard drilling at 19.0'
	20.1				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
 WATER LEVELS : 6.1 ft bgs on 11/30/07 START : 11/29/2007 END : 12/1/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
22.3	20.0 R1-NQ 1.5 ft 73%	50	1	20.1' - Fracture, horizontal, rough, undulating, bedding plane fracture, half of fracture surface open, <1/16" silt infill		Limestone 20.0-21.1' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), fine grained, mild HCl reaction, weak (R2), voids to 1/16" diameter over 30% of rock, 5-10% cavities up to 1/4" diameter, poorly fossiliferous, trace recrystallization in pore space No Recovery 21.1-21.5' Limestone 21.5-24.75' - dark yellowish orange, (10YR 6/6), fine grained, moderate HCl reaction, weak (R2), voids to 1/16" diameter over 40% of core surface, 5-10% spherical and elongated cavities up to 1/4" diameter, highly fossiliferous (molds/casts) No Recovery 24.75-26.5' Limestone 26.5-27.15' - dark yellowish orange to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), fine to medium grained, mild HCl reaction, extremely weak (R0), voids to 1/16" cover 40% of core surface, 5-10% cavities up to 1/4" diameter, possible bioturbation at 26.9'; trace silt infill, trace recrystallization in void space, poorly fossiliferous Silt (ML) 27.15-27.9' - grayish orange, (10YR 7/4), wet, soft, nonplastic, very rapid dilatancy, moderate HCl reaction, with 10% fine to coarse sand-sized limestone fragments Limestone 27.9-28.75' - Same as 26.5-27.15' 28.75-28.9' - pale yellowish brown to dark yellowish orange, (10YR 6/2 to 10YR 6/6), very fine to fine grained, strong HCl reaction, weak (R2), voids (1/16") over 1% of core surface, poorly fossiliferous No Recovery 28.9-31.5' Limestone 31.5-32.15' - yellowish gray to moderate yellow, (5Y 7/2 to 5Y 7/6), very fine to fine grained, mild HCl reaction, very weak (R1), small voids (1/16") over 2% of core surface, 2 possible cavities up to 3/4" diameter, very poorly fossiliferous, black staining covers 40% of surface, also trace iron staining orange-red yellow color	Water level is 6.1' below ground surface on 11/30/07 at 07:50 Begin rock coring at 20' R1: 8 minutes 08:50-10:15 Changing out damaged drill bit Driller's Remark: Soft drilling at 23.0', hard at 24.0' R2: 23 minutes Driller's Remark: Soft drilling at 27-28' R3: 8 minutes Driller's Remark: Soft at 32.0-32.5', hard at 32.5' R4: 21 minutes Driller's Remark: Soft drilling from 36.5-38', hard at 38.0', soft at 38-38.5', hard at 38.5'	
21.5		NR	20.85' - Fracture, 10 deg, smooth to rough, undulating, open, <1/16" fine sand and silt infill					
25	R2-NQ 5 ft 65%	45	>10	20.91' - Fracture, 65 deg, rough, undulating, trace of fine sand infill, open				
17.3		0	4	21.65' - Fracture, 75 deg, rough, undulating, open				
		NR	1	22.1-23.0' - Fracture zone, horizontal, angular limestone fragments with trace of silt infill				
		NR	0	22.6' - Fracture, 5 deg, rough, undulating, tight				
		NR	NR	22.75' - Fracture, 75 deg, smooth, undulating, open to tight (other surface in fragments but fits tight on surface)				
		NR	NR	22.85' - Fracture, 20 deg, rough, undulating to stepped, open				
		NR	>10	23.5' - Fracture, 20 deg, rough, undulating, tight				
		NR	>10	24.15' - Fracture, 70 deg, rough, undulating, 1/4" open				
		NR	>10	26.75' - Fracture, 10 deg, rough, undulating, open				
	R3-NQ 5 ft 48%	0	>10	26.9-27.15' - Fracture zone, subangular limestone rock fragments up to 1-1/2" diameter				
30		NR	NR	27.9-28.4' - Fracture zone, fragments from coarse sand size to 3/4" diameter, subangular to angular				
12.3		NR	NR	28.5' - Fracture, vertical, rough, undulating, tight				
		NR	1	28.6-28.7' - Fracture zone, rock fragments				
		NR	1	28.8' - Fracture, 85 deg, rough, undulating				
		NR	1	31.9' - Fracture, 20 deg, smooth to rough, undulating, open				
		NR	1	32.9' - Fracture, 20 deg, rough, undulating, 1/2" open				
	R4-NQ 5 ft 91%	82	3	33.7, 34.0' - Fractures (2), 20 deg, rough, undulating to stepped, open up to 1/2", <1/16" sand infill				
		NR	1	34.45' - Fracture, 10 deg, smooth, planar, tight				
		NR	1	35.6' - Fracture, horizontal, rough, undulating, open up to 1"				
		NR	NR	36.0' - Fracture, 70 deg, rough, undulating, open (missing half of fracture surface)				
		NR	>10	36.65-36.85' - Fracture zone, subangular to subrounded rock fragments with rough to smooth and undulating surfaces				
		NR	>10	37.3' - Fracture, 20 deg, rough, undulating, up to 1/4" open				
	R5-NQ 5 ft 42%	16	0	37.35, 37.5, 37.7' - Fractures (3), 25 deg, rough, undulating, open up to 1/2", trace sand infill				
		NR	NR	37.85' - Fracture zone, rock fragments				
40								



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
 WATER LEVELS : 6.1 ft bgs on 11/30/07 START : 11/29/2007 END : 12/1/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
2.3			NR	38.0' - Fracture, 20 deg, rough, undulating, up to 1/2" open 38.15' - Fracture, 20 deg, rough, undulating 38.2' - Fracture, 10 deg, rough, undulating			
41.5			2	42.25' - Fracture, 20 deg, rough, undulating, tight			
	R6-NQ 5 ft 40%	25	>10	42.35' - Fracture, horizontal, rough, undulating, up to 1" open 42.9' - Fracture, 20 deg, rough, undulating, trace sand infill 43.15-43.5' - Fracture zone, fine to coarse gravel-sized subangular to subrounded rock fragments			R5: 7 minutes
45 -2.7			NR				
46.5			2	46.8' - Fracture, horizontal, rough, undulating, tight to 1/4" open, trace black staining on surfaces			
	R7-NQ 5 ft 92%	40	4	47.5, 47.65' - Fracture (2), horizontal, rough, undulating, tight to 1/4" open, black organic staining covers 5% fracture surfaces			
			>10	47.95' - Fracture, 40 deg, rough, undulating to stepped, eroding fracture surface			
50 -7.7			>10	47.95-48.7' - Fracture zone, horizontal, many bedding plane fractures, fissile/easily broken material			
			1	48.7' - Fracture, 70 deg, smooth to rough, undulating, eroding fracture surface			
			NR	48.7-49.25' - Fracture zone, sand to coarse gravel-sized rock fragments			
			>10	49.15' - Fracture, vertical, rough, stepped, open			
			0	49.8' - Fracture, 80 deg, rough, stepped, open			
	R8-NQ 5 ft 62%	38	3	49.8-50.2' - Fracture zone, silt to fine gravel-sized rock fragments			
			0	50.2' - Fracture, 80 deg, rough, stepped, open			
55 -12.7			NR	50.6' - Fracture, 10 deg, rough, stepped, tight to 1/4" open, <1/16" silt infill 51.5-52.2' - Fracture zone, rock fragments from fine to coarse gravel-sized, subangular to subrounded			
				52.2' - Fracture, 0-10 deg, rough, undulating, open			
			0	53.7' - Fracture, horizontal, smooth to rough, planar, tight			
			1	54.05' - Fracture, 10 deg, rough, undulating, tight			
			3	54.25' - Fracture, horizontal, rough, undulating, fossil prints in black staining on fracture surface			
	R9-NQ 5 ft 98%	70		58.4' - Fracture, horizontal, rough, undulating, open, 1" sand and silt infill, black staining on 1% of fracture surface			
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-02	SHEET 4 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
 WATER LEVELS : 6.1 ft bgs on 11/30/07 START : 11/29/2007 END : 12/1/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-17.7			>10	58.9' - Fracture, horizontal, rough, undulating, tight to 1/4" open	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 HCl 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 HCl 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 HCl 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 HCl 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, silt 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 HCl reaction, extremely weak (R0), no voids, trace cavities, 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 HCl 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 60.4-61.4' 61.9-66.5' - Same as 56.5-59.15' 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	Driller's Remark: Hard drilling at 59.5' R9: 11 minutes	
61.5			0	59.15' - Fracture, horizontal, rough, undulating, fissile surfaces, tight		R10: 11 minutes	
			NR	59.25' - Fracture or mechanical break, rough, stepped, tight			
			1	59.6' - Fracture, horizontal, rough, undulating, 1/4" open			
			1	59.8' - Fracture, horizontal, rough, undulating, 1" of silt and sand infill between the two fracture surfaces			
	R10-NQ 5 ft 100%	100	1	60.2' - Fracture, horizontal, rough, stepped, tight			
65			1	62.1' - Fracture, 10 deg, smooth, undulating, tight to 1/4" open			
-22.7			1	63.05' - Fracture or mechanical break, horizontal, smooth, undulating, tight			
			1	64.0' - Mechanical break			
			1	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			



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-03	SHEET 1 OF 4
SOIL BORING LOG		

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
 WATER LEVELS : 3.0 ft bgs on 12/03/07 START : 12/2/2007 END : 12/5/2007 LOGGER : D. Whitaker, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
40.8	0.0	1.2	SS-1	1-2-2 (4)	Topsoil 0.0-0.4' - brownish black, (5YR 2/1), organics Poorly Graded Sand (SP) 0.4-1.15' - yellowish gray, (5Y 7/2), moist, very loose, very fine to fine grained, no HCl reaction, silica sand, 5% organics, trace nonplastic fines		
5	1.5						
35.8	5.0				No Recovery 5.0-6.5'		
	6.5	0.0	SS-2	3-2-3 (5)			
	8.0	0.4	SS-3	NA (NA")	Fat Clay With Sand (CH) 6.5-6.9' - light olive gray, (5Y 6/1), wet, very soft, high plasticity, slow dilatancy, no HCl reaction, 15% fine silica sand		Driller's Remark: Medium chatter at 6.5' Due to no recovery at previous interval, another sample was collected at 6.5-8.0' SPT results not recorded
10	10.0						
30.8	10.5	0.2	SS-4	50/5.5 (50/5.5")	Silt (ML) 10.0-10.2' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), mild to moderate HCl reaction, 70% nonplastic fines		Driller's Remark: Moderate chatter and hard at 10.0'
							Driller's Remark: Light chatter at 13.5-15.0'
15	15.0						
25.8	16.5	1.2	SS-5	27-13-14 (27)	Sandy Silt And Limestone Fragments (ML) 15.0-16.15' - pale yellowish orange to dark yellowish orange, (10YR 8/6 to 10YR 6/6), wet, very stiff, high dilatancy, moderate HCl reaction, 15-20% fine to coarse grained sand and gravel size limestone fragments		
20							Driller's Remark: 19.5-20.0' soft



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-03	SHEET 2 OF 4
SOIL BORING LOG		

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
 WATER LEVELS : 3.0 ft bgs on 12/03/07 START : 12/2/2007 END : 12/5/2007 LOGGER : D. Whitaker, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
20.8	20.0	0.7	SS-6	3-50/3.5 (53/9.5")	Silty Sand And Limestone Fragments (SM) 20.0-20.7' - dusky yellow, (5Y 6/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines; 40% fine gravel-sized limestone fragments, carbonate sand	Driller's Remark: Very hard at 20.5' 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'	
	20.8						
25	25.0	0.7	SS-7	9-30-50/1.5 (80/7.5")	Silty Gravels (GM) 25.0-25.7' - dark yellowish orange, (10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, carbonate sand, 24% nonplastic fines, 20% gravel-sized limestone fragments	Driller's Remark: Dropped 3 inches from 25.5-25.75' (soft or possible void)	
15.8							
30	30.0	0.6	SS-8	29-50/3.5 (79/9.5")	Limestone With Silty Sand 30.0-30.6' - dusky yellow, (5Y 6/4), wet, very dense, mild to moderate HCl reaction, gravel sized grains, 30% silty sand (SM) similar to 25.0-25.7'	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'	
10.8							
35	35.0	0.5	SS-9	40-50/0.75 (90/6.75")	Limestone With Silty Sand 35.0-35.5' - Same as 30.0-30.6 Begin Rock Coring at 35.5 ft bgs See the next sheet for the rock core log	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	
5.8							
40	35.6						



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-03	SHEET 3 OF 4
ROCK CORE LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 12/03/07 START : 12/2/2007 END : 12/5/2007 LOGGER : D. Whitaker, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
35.5	R1-NQ 1.5 ft 80%	50	>10	35.5-35.85' - Fracture zone, fine to coarse angular gravel sized fragments	Limestone 35.5-36.7' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), very fine to fine grained, mild HCl reaction, weak (R2), voids 1/16" diameter over 1% core surface, 2 cavities up to 1/2"x1-1/2" 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 HCl reaction, weak (R2), voids 1/16" 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 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' 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 HCl reaction, weak (R2), voids 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'	Begin rock coring at 35.5'	
37.0			1	35.85' - Fracture, 60 deg, rough, undulating, open		R1: 8 minutes	
			NR	36.6' - Fracture, 70 deg, rough, undulating, open 1/16"-1/8", organic infilling			
			3	37.0-37.15' - Fracture zone, angular fine gravel sized fragments			
			0	37.65' - Fracture, horizontal, smooth, undulating, 1/4" open			
40	R2-NQ 5 ft 96%	78	1	37.75' - Fractures (3), 40-50 deg, smooth, undulating, 2 open, 1 tight			
0.8			1	39.1' - Fracture, horizontal, rough, planar, open up to 1/4"			
			1	39.5, 40.25' - Mechanical break (2)			
			2	40.6' - Fractures, horizontal, rough, stepped, tight		R2: 18 minutes	
			NR	41.35, 41.7' - Fractures (2), horizontal, rough, undulating, fissile up to 1/2" open			
			3	42.1' - Fracture, 15 deg, rough, undulating, tight, fissile			
			>10	42.7, 42.8' - Fractures (2), horizontal, rough, undulating, open up to 1/2", fissile			
45	R3-NQ 5 ft 45%	11	1	43.0, 43.3' - Fractures (2), 0-10 deg, rough, undulating, open up to 1/2"			
-4.2			NR	43.4-43.55' - Fracture zone, coarse sand to fine gravel size subrounded fragments			
			NR	43.8, 44.0, 44.3' - Fractures (3), horizontal, rough, undulating, tight to 1/2" open	R3: 3 minutes		
			2	47.15' - Fracture, horizontal, rough, undulating, open			
			0	47.41' - Fracture, horizontal, smooth to rough, undulating, open up to 1/2"			
50	R4-NQ 5 ft 24%	16	NR				
-9.2			NR		R4: 18 minutes		
			5	52.15' - Fracture, horizontal, rough, planar to rough stepped, open up to 1/2", organic infilling, 1/16" thick			
			>10	52.4' - Fracture, horizontal, rough, stepped, tight, organic infilling, 1/16" thick			
			0	52.6' - Fracture, horizontal, rough, undulating, open up to 1/2", silt infilling			
			0	52.8-52.9' - Fracture zone, 0-10 deg, rough, undulating, open			
55	R5-NQ 5 ft 40%	0	0				
-14.2			0		Water level 3' 2" below ground surface at 07:20 on 12/4/07		



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-03	SHEET 4 OF 4
ROCK CORE LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 12/03/07 START : 12/2/2007 END : 12/5/2007 LOGGER : D. Whitaker, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
57.0	R6-NQ 5 ft 50%	30	NR	53.15' - Fracture, 70 deg, rough, undulating, open 53.15-53.5' - Fracture zone, gravel sized rock fragments 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 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 59.25' - Fracture, 15 deg, rough, undulating, tight	Limestone 52.55-54.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, extremely weak to very 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 52.8-53.2' No Recovery 54.0-57.0' Limestone 57.0-59.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild 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, 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 7/2), medium to fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1/10"-1/2" Silty Limestone 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) Limestone 64.65-67.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium to coarse grained, moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 30-40% of core surface, trace organics, irregular bedding with depth 67.0-71.2' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium to coarse grained, mild HCl reaction, voids up to 1/2" over 5% of core surface predominately from 68.8-69.8', voids <1/16" over 45-55% of core surface, trace organics, moderately to highly fossiliferous (casts/molds) No Recovery 71.2-72.0' Bottom of Boring at 72.0 ft bgs on 12/5/2007	R5: 7 minutes		
60 -19.2			>10					Driller's Remark: Soft at 57-59.6', hard at 59.5-62'
62.0			>10					R6: 8 minutes
65 -24.2			R7-NQ 5 ft 100%	88		1	62.4' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight		Original boring CT-03 abandoned at 62' due to casing problems; replacement boring located 5' north of original boring Replacement boring blind drilled to 62'
67.0	R8-NQ 5 ft 84%	57	0					
			3	64.55' - Bedding plane, <5 deg, smooth, undulating, tight 64.65' - Bedding plane, <5 deg, smooth, 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 67.25, 67.67, 67.8' - Mechanical break (3), <5 deg, rough, undulating, tight		R7: 19 minutes		
70 -29.2			1	69.1' - Mechanical break or bedding plane, <5 deg, rough, planar, open <1/16"				
			2	70.0' - Fracture, 5-10 deg, rough, undulating, tight				
72.0			NR	70.9' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/8"		R8: 6 minutes Total depth of boring 72.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-04	SHEET 1 OF 3
SOIL BORING 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
 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 : 4.0 ft bgs on 11/30/07 START : 11/29/2007 END : 11/30/2007 LOGGER : T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
40.8	0.0	0.8	SS-1	0-2-2 (4)	Topsoil 0.0-0.2' - brownish black, (5YR 2/1), organics (roots, wood) 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	0.9	SS-2	1-2-3 (5)	Lean Clay With Sand (CL) 5.0-5.6' - greenish gray and light olive gray, (5G 6/1 and 5Y 6/1), mottled, moist, firm, low to medium plasticity, slow dilatancy, 15-20% very fine to fine silica sand, trace rootlets 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 30.8	10.0	1.3	SS-3	14-34-50 (84)	Silty Sand And Limestone (SM) 10.0-11.3' - yellowish gray, (5Y 8/1), moist, very dense, fine to coarse grained, strong HCl reaction, 15-20% nonplastic fines, 40-50% fine to coarse limestone fragments, 50-60% SM, all carbonate		Driller's Remark: 50% water loss at 10'
15 25.8	15.0	1.3	SS-4	13-30-33 (63)	Silt (ML) 15.0-16.3' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, slow dilatancy, mild HCl reaction, 10% fine to medium sand-sized, <5% limestone fragments to 1/2", all carbonate materials		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-04	SHEET 2 OF 3
SOIL BORING 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
 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 : 4.0 ft bgs on 11/30/07 START : 11/29/2007 END : 11/30/2007 LOGGER : T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
20.8	20.0	1.2	SS-5	24-32-30 (62)	Silt With Sand And Limestone (ML) 20.0-21.2' - grayish yellow, (5Y 8/4), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% fine to medium sand-sized, 15-20% fine rounded limestone grains, some are knobby connections, carbonate materials		
	21.5						
25	25.0	0.0	SS-6	50/3 (50/3")	No Recovery 25.0-25.3'		
15.8	25.3						
30	30.0	1.3	SS-7	38-51-45 (96)	Silty Sand (SM) 30.0-31.3' - grayish yellow, (5Y 8/4), wet, very dense, fine to coarse grained, moderate HCl reaction, 30% nonplastic fines, 10-15% fine limestone fragments and grains, carbonate materials		
10.8	31.5						
35	35.0	0.0	SS-8	50/1.5 (50/1.5")	No Recovery 35.0-35.1'		
5.8	35.1						
					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
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

WATER LEVELS : 4.0 ft bgs on 11/30/07 START : 11/29/2007 END : 11/30/2007 LOGGER : T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
5.8	35.0 R1-NQ 1 ft 90%	42	>10	35.45-35.65' - Fracture zone, fine infilling (20-30% of zone)		Limestone 35.0-35.45' - yellowish gray, (5Y 7/2), fine to coarse grained, mild HCl reaction, very weak to weak (R1 to R2), voids to 1/8" (predominantly <1/16") over 20-30% of surface, fossiliferous (casts/molds) 35.45-35.9' - Same as 35.0-35.45' except extremely weak (R0) No Recovery 35.9-36.0' Limestone 36.0-39.9' - yellowish gray, (5Y 7/2), fine to coarse grained, mild HCl reaction, very weak to weak (R1 to R2), with zones of extremely weak (R0) rock at 36.5-36.6' and 37.5-38.15', voids to <1/16" over 15-25% of surface, fossiliferous (casts/molds), <5% possible laminar bedding planes No Recovery 39.9-41.0' Limestone 41.0-41.55' - Same as 36.0-39.9' except moderately fossiliferous 41.55-45.2' - yellowish gray transitioning to pale olive with depth, (5Y 7/2 to 10YR 6/2), very fine to fine grained, strong to moderate HCl reaction, weak to medium strong (R2 to R3), trace voids (<1/16"), fossiliferous (casts and molds), burrow or solution cavity (3/16" diameter) at 42.28' No Recovery 45.2-46.0' Limestone 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 with depth, 1" solution cavities at 47.35' and 47.7', trace irregular bedding planes 50.0-50.7' - yellowish gray, (5Y 7/2), medium to coarse grained, mild HCl reaction, very weak to weak (R1 to 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	Begin rock coring at 35.0' R1: 2 minutes R2: 8 minutes Driller's Remark: 100% water loss at 42' R3: Run time not recorded R4: Run time not recorded Total depth of boring is 51.0' Driller's Remark: Water level is 3.5' below ground surface	
40	R2-NQ 5 ft 78%	28	3	35.7' - Bedding plane, <5 deg, <1/16" open				
0.8			2	35.8' - Bedding plane, <5 deg, <1/16" open				
			3	36.2' - Fracture, <5 deg, rough, undulating, open to 1/4"				
			0	36.6' - Bedding plane, <5 deg, rough, undulating, tight				
			3	36.75' - Fracture, 70-75 deg, rough, undulating, tight				
			0	36.9' - Mechanical break or fracture, <5 deg, rough, undulating, tight				
			NR	37.25' - Bedding plane, <5 deg, rough, undulating, fine to coarse sand sized infill, no opening, open 1/8"-1/2"				
				37.7' - Bedding plane, <5 deg, rough, undulating, tight				
				38.2' - Bedding plane, <5 deg, rough, undulating, open 3/16", fine to coarse sand-sized infill, 100% of opening filled				
				38.55' - Fracture, 60-70 deg, rough, undulating, open				
				38.9' - Mechanical break				
				41.15' - Bedding plane, <5 deg, rough, undulating, open <1/16"				
				41.3-41.55' - Fracture zone, fragments to 1" (predominately <1/2")				
				42.1' - Fracture, 65-70 deg, smooth, planar				
				42.3' - Mechanical break or bedding plane, <5 deg, rough, undulating, open to 1/16", trace fine infilling				
				45.1' - Mechanical break, 65-75 deg, rough, undulating, tight				
				45.2' - Fracture, 5 hairline fractures from 45.2' to end of core				
				46.85' - Bedding plane, <5 deg, rough, planar, trace fine infilling, open 1/4"				
				46.95' - Mechanical break, <5 deg, rough, undulating, tight				
				47.45' - Fracture, 5-15 deg, rough, undulating, open				
				47.75' - Fracture, <5 deg, closed, does not go all the way through				
				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"				
				50.0-50.1' - 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"				



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-05	SHEET 1 OF 5
SOIL BORING 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
 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 : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
41.5	0.0	0.9	SS-1	1-1-2 (3)	Poorly Graded Sand With Organics (SP) 0.0-0.9' - pale yellowish brown, (10YR 6/2), moist, very loose, very fine to fine grained, no HCl reaction, silica sand, trace nonplastic fines, 5-10% organics and roots	Begin drilling on 11/12/07 at 16:00 Surface is recently cleared tree plantation	
	1.5						
5 36.5	5.0	1.0	SS-2	2-2-2 (4)	Poorly Graded Sand With Clay (SP-SC) 5.0-5.5' - dark yellowish orange, (10YR 6/6), moist to wet, very loose, fine grained, 9% moderate plasticity fines, silica sand 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	5.0-5.5' SS-2A 5.5-6.0' SS-2B	
	6.5						
10 31.5	10.0	0.9	SS-3	2-3-5 (8)	Silty Sand (SM) 10.0-10.2' - light greenish gray, (5GY 8/1), wet, loose, fine to coarse grained, strong HCl reaction, sand is predominately fossil fragments, 20% nonplastic fines Silty 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	10.0-10.2 SS-3A 10.2-10.9 SS-3B	
	11.5						
15 26.5	15.0	0.7	SS-4	34-50/2 (84/8")	Silt And Limestone (ML) 15.0-15.7' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 49% coarse sand-sized and fine gravel-sized limestone fragments, strong HCl reaction in the limestone, all carbonate materials		
	15.7						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-05	SHEET 2 OF 5
SOIL BORING 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
 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 : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
21.5	20.0 20.3	0.4	SS-5	26-50/0.5 (76/6.5")	Silt And Limestone (ML) 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	|||	Resume drilling at 08:12 on 11/13/07 Driller's Remark: 100% circulation loss 08:47 3" NW casing installed to 20.0'
25 16.5	25.0	1.2	SS-6	29-45-27 (72)	Silt With Sand And Limestone (ML) 25.0-26.2' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15-25% fine to medium sand-sized varies throughout sample, 25% fine gravel-sized limestone fragments, carbonate materials	|||	Possible slough top of sample, 3 angular to subangular fragments up to 1.0", strong HCl reaction
30 11.5	30.0	0.5	SS-7	20-0-4 (4)	Limestone Fragments And Silt (ML) 30.0-30.4' - grayish orange, (10YR 7/4), 75% limestone in fine to coarse gravel-sized fragments, mild HCl reaction, 25% silt which is wet, soft, nonplastic, rapid dilatancy, mild HCl reaction, carbonate Assumed Cavity 30.4-31.4' Sandy Silt (ML) 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	|||	20 blows first 6.0" then rods fell 11.0", 4 blows last inch Driller's Remark: Cavity in rod drop zone Soil descriptions for sample SS-7 assumes cavity at 30.4-31.4' based on soil sample appearance and driller's note 10:03 Casing advanced to 30'
35 6.5	35.0	1.2	SS-8	23-51-50/2.5 (101/8.5)	Silty Sand With Limestone (SM) 35.0-35.5' - grayish orange, (10YR 7/4), wet, very dense, fine to coarse grained, moderate HCl reaction, 26% nonplastic fines, 32% fine to coarse gravel-sized limestone fragments, all carbonate materials Silty Sand (SM) 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 materials	|||	10:35 Casing advanced to 35.0' 35.0-35.5' SS-8A 35.5-36.2' SS-8B Driller's Remark: 100% water loss at 38.0'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-05	SHEET 3 OF 5
SOIL BORING 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
 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 : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
		6"-6"-6" (N)		6"-6"-6" (N)			
1.5	40.0	1.3	SS-9	15-8-6 (14)	Silty Sand (SM) 40.0-41.3' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, medium dense, fine to coarse grained, mild to moderate HCl reaction, 25% nonplastic fines, 10-15% fine gravel-sized limestone fragments, all carbonate materials		Driller's Remark: Chatter at 43.5'
	41.5						
45	45.0	0.0	SS-10	50/2.5 (50/2.5")	No Recovery 45.0-45.2' Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log		
-3.5	45.2						
50							
-8.5							
55							
-13.5							
60							



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
 WATER LEVELS : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-3.5	45.0 R1-NQ 1 ft 100%	33	3	45.35, 45.58' - Mechanical break (2), 10-15 deg, rough, undulating, tight		Limestone 45.0-46.5' - light olive gray, (5Y 6/1), fine to medium grained, moderate HCl reaction, weak (R2), strong HCl reaction where pulverized, highly fossiliferous (casts/molds over 40-50% of sample), voids (up to 1/16") over 10-15% of surface, trace voids up to 1/2" 46.5-46.3' - Fracture zone, subangular limestone fragments (up to 1-1/2") 46.45' - Bedding plane, <5 deg, rough, undulating 46.8' - Fracture, 80-90 deg, rough, undulating 47.1' - Mechanical break or bedding plane, <5 deg, smooth, stepped 48.1, 48.5, 48.85' - Mechanical break (3), <10 deg, rough, undulating 49.0' - Mechanical break or bedding plane, <10 deg, rough, undulating 49.5, 49.6' - Mechanical break or bedding plane (2), <10 deg, rough, undulating 50.0' - Fracture, 5-15 deg, rough, undulating 50.4' - Mechanical break, 5-10 deg, rough, undulating No Recovery 50.5-51.0' Limestone 51.0-53.85' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, very weak (R1), fossiliferous (casts/molds), voids (up to 1/16") over 15-25% of surface No Recovery 53.85-56.0' Limestone 56.0-61.0' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), weak (R1) rock at 58.5-58.8', fossiliferous (casts and trace molds), voids (up to 1/16") over 5-15% of surface decreasing with depth 61.0-66.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), very weak (R1) rock transitions with depth to weak (R2) rock, voids (up to 1/16") over 5-15% of surface decreasing with depth, trace fossils (casts/molds)	Casing set at 45.0' Begin coring with NQ, hard formation bit Driller's Remark: Water level approximately 7.0' below ground surface 08:11 Begin drilling first run on 11/14/07 First run only 1 foot to set stroke R1: 4 minutes Driller's Remark: Softer at 49.5' R2: 27 minutes Driller's Remark: Soft at 52.0' R3: 9 minutes Driller's Remark: Harder at 55.0', no circulation R4: 11 minutes Driller's Remark: Water level at 4.4'	
46.0	R2-NQ 5 ft 90%	57	>10	45.76' - Bedding plane, <5 deg, rough, planar, open <1/16"				
50			1	46.45' - Bedding plane, <5 deg, rough, undulating				
50			2	46.8' - Fracture, 80-90 deg, rough, undulating				
50			3	47.1' - Mechanical break or bedding plane, <5 deg, smooth, stepped				
50			NR	48.1, 48.5, 48.85' - Mechanical break (3), <10 deg, rough, undulating				
50			2	49.0' - Mechanical break or bedding plane, <10 deg, rough, undulating				
50			NR	49.5, 49.6' - Mechanical break or bedding plane (2), <10 deg, rough, undulating				
50			0	50.0' - Fracture, 5-15 deg, rough, undulating				
50			2	50.4' - Mechanical break, 5-10 deg, rough, undulating				
50			>10	52.5' - Mechanical break, <5 deg, rough, undulating, tight				
50			NR	52.75' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight				
50			NR	53.15-53.75' - Fracture zone, general orientation 75-85 deg with multiple breaks <5 deg, possibly many mechanical breaks or bedding planes along a long fracture, limestone fragments up to 2-1/2"				
50			2	56.1, 56.5' - Bedding plane (2), <5 deg, rough, undulating, tight to open <1/16"				
50			2	57.7' - Mechanical break, 1-5 deg, rough, undulating, tight				
50			2	57.9' - Bedding plane, <5 deg, rough, planar, tight				
50			2	58.3' - Fracture, 5-10 deg, smooth, planar, open <1/16", trace infill (fines)				
50			3	58.9' - Mechanical break, <5 deg, rough, undulating, tight				
50			5	59.55' - Bedding plane, 5-10 deg, rough, undulating, open 1/8"				
50			2	59.75' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight				
50			5	60.1' - Fracture, <5 deg, rough, undulating, open 1/8"				
50			2	60.3' - Mechanical break, <5 deg, rough, undulating, tight				
50			>10	60.8' - Fracture or bedding plane, <5 deg, rough, undulating, open 1/4"-1/2", less than 1/2" fragment in opening				
50			>10	61.07' - Mechanical break or bedding plane, 1-5 deg, rough, undulating, open <1/16"				
65								



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 LEVELS : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-23.5	66.0		0			R5: 10 minutes	
					Bottom of Boring at 66.0 ft bgs on 11/14/2007	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	



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-06	SHEET 1 OF 7
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 0.5 ft bgs on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
41.4	0.0	1.5	SS-1	3-4-6 (10)	Topsoil 0.0-0.2' - wood chips, no roots, silica sand Poorly Graded Sand (SP) 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'		
5 36.4	5.0	6.5	SS-2	3-4-5 (9)	Poorly Graded Sand (SP) 5.0-6.1' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), wet, loose, fine grained, no HCl reaction, silica sand, trace nonplastic fines, trace roots		
10 31.4	10.0	11.5	SS-3	4-4-5 (9)	Poorly Graded Sand (SP) 10.0-11.4' - yellowish gray, (5Y 8/1), wet, loose, fine grained, no HCl reaction, silica sand, trace nonplastic fines		
15 26.4	15.0	16.5	SS-4	4-5-6 (11)	Sand Silt (ML) 15.0-16.3' - light gray, (N7), wet, stiff, nonplastic, no HCl reaction, 38% fine grained silica sand		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-06	SHEET 2 OF 7
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 0.5 ft bgs on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.4	20.0	1.3	SS-5	3-4-2 (6)		Stop SPT for the day 11/12/07 at 17:00 Resume SPT on 11/13/07 at 08:00 Water level 0.5' below ground surface
	21.5			Sandy Fat Clay (CH) 20.0-20.5' - very light gray with very pale blue mottling, (N8 with 5B 8/2), wet, medium stiff, high plasticity, no dilatancy, no HCl reaction, 25-30% very 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		
25	25.0	0.6	SS-6	0-0-0 (0)		Weight of hammer drove SS-6 (25.0-25.6') through all 18" for SPT Driller's Remark: 25% loss of circulation at 27.5', some drill chatter
16.4	26.5			Fat Clay (CH) 25.0-25.6' - pale brown, (5YR 5/2), wet, soft, medium to high plasticity, slow dilatancy, no HCl reaction, trace fine grained silica sand, final 0.05' of sample consists of compacted silica sand or fine grain sandstone		
30	30.0	0.6	SS-7	31-50/4.5 (81/10.5")		
11.4	30.9			Silt (ML) 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	0.7	SS-8	25-32-29 (61)		
6.4	36.5			Silty Sand (SM) 35.0-35.7' - grayish orange, (10YR 7/4), wet, dense, fine to coarse grained, mild to moderate HCl reaction, 25% nonplastic fines, 5-10% fine gravel-size limestone fragments, all carbonate material		
40	40.0	0.1	SS-9	50/3.5 (50/3.5")		End SPT soil sampling Switching to rock coring at 09:20 (refusal blow count, limestone fragments)
	40.3			Limestone Fragments 40.0-40.1' - moderate yellowish brown, (10YR 5/4), 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		

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 on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
1.4	40.0 R1-NQ 1.5 ft 40%	29	1	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 to 1/4" No Recovery 40.8-46.5'	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 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	
41.5	R2-NQ 5 ft 0%	0	NR	R2: 3 minutes			
45 -3.6	46.5	13	5	46.6' - Mechanical break 46.7-46.8' - Fracture, 45 deg, rough, undulating, open	Limestone 46.5-48.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), trace to 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'	Driller's Remark: Soft at 47.0-48.5', 100% circulation lost at 47.0'	
	R3-NQ 5 ft 40%		4	47.1-47.2' - Fracture (3), horizontal, rough, undulating, loose fragments 1" in size, open 47.4' - Fracture, 30 deg, rough, planar, 1/4" open 47.7' - Fracture, horizontal, smooth, undulating, <1/16", open, related to cavity at 47.7'			R3: 16 minutes
50 -8.6	51.5		NR	47.9' - Fracture, horizontal, rough, undulating, open 47.9-48.1' - Fracture, 60 deg, rough, undulating, 1/8" relief 48.4' - Fault, horizontal, smooth, planar to undulating, <1/8" relief			
55 -13.6	56.5	0	NR	56.65' - Fracture, horizontal, rough, undulating, 1/8" open 56.9' - Fracture, 10 deg, rough, undulating, 1/8" open 57.0' - Mechanical break 57.1-57.3' - Fracture, 60 deg, rough, undulating to planar, black staining over 80% of surface	Limestone 56.5-57.4' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl 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'	Driller's Remark: Soft throughout run R4, still no circulation R4: 4 minutes	
60	R4-NQ 5 ft 0%	0	NR	R5-NQ 5 ft 18%			



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 bgs on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-18.6						R5: 10 minutes	
61.5						No SPT taken	
65	R6-NQ 5 ft 28%	0	NR		Silt With Sand (ML) 61.5-62.9' - grayish orange, (10YR 7/4), wet, hard, nonplastic, mild HCl reaction, 15% fine to very fine sand-sized particles, all carbonate material No Recovery 62.9-71.5'		
-23.6						R6: 8 minutes Stop for day 11/13/07 at 17:00 Resume coring on 11/14/07 at 8:00; depth is 66.5' Water level 4.0' below ground surface Casing advanced to 65.0' Driller's Remark: Circulation returned	
66.5							
70	R7-NQ 5 ft 0%	0	NR				
-28.6						R7: 26 minutes Driller's Remark: Rock fragments lodged in core barrel, likely destroyed sample Driller's Remark: Soft at 71.5-74.5', increased resistance from 74.5-76.5'	
71.5							
75	R8-NQ 5 ft 80%	0			Limestone 71.5-75.5' - grayish orange, (10YR 7/4), medium grained, mild HCl reaction, extremely weak (R0), no visible voids or cavities No Recovery 75.5-76.5'		
-33.6						R8: 10 minutes	
76.5							
77.5							
78.5							
79.5							
80	R9-NQ 5 ft 62%	23			Limestone 76.5-78.2' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), trace voids up to 1/16", trace cavities to 3/4"x3/8" 78.2-79.6' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, extremely weak (R0), no visible voids or cavities No Recovery 79.6-81.5'	Driller's Remark: Circulation loss (100%) at 76.0' Driller's Remark: Medium resistance from 76.5-78.5' Driller's Remark: Hard at 78.5-81.8' Driller's Remark: Soft at 81.5-83.0' Driller's Remark: Hard at 83.0-84.5'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-06	SHEET 5 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 on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-38.6			NR	78.9' - Fracture, horizontal, rough, undulating, tight 79.5' - Fracture, 20 deg, rough, undulating, 1/8" open			R9: 11 minutes
81.5			>10	81.5-82.1' - Fracture zone, fine to coarse sand-sized and fine to coarse gravel fragments		Limestone 81.5-83.1' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, weak (R2), trace voids to 1/16"	
	R10-NQ 5 ft 32%	8	1	82.1-82.4' - Fracture, 70 deg, rough, undulating, opposing face fractured 82.4-82.5' - Fracture, 45 deg, rough, undulating, 1/4" open 83.0' - Mechanical break		No Recovery 83.1-86.5'	
85 -43.6			NR				Driller's Remark: Soft at 84.5-85.5'
86.5			>10	86.5-87.1' - Fracture zone, two dominant 60 deg fractures, at 86.5-86.7' and 86.7-87.0', rough and undulating surfaces, multiple fragments of fine gravel size		Limestone 86.5-90.2' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak (R2), 10-15% coverage of voids up to 1/16", trace cavities up to 3/8"x-9/16", cavities increasing in frequency with depth	Driller's Remark: Hard at 85.5-86.5' Driller's Remark: Medium drilling at 86.5-88.0'
	R11-NQ 5 ft 74%	32	1	88.05' - Fracture, horizontal, rough, undulating, opposite face at 60°; open 88.5-88.8' - Fracture zone, several medium gravel-sized fragments, terminates at 60 deg face			Driller's Remark: Hard at 88.0-91.5'
90 -48.6			>10	89.1-89.4' - Fracture zone, medium to coarse gravel-sized fragments		No Recovery 90.2-91.5'	
			NR				R11: 15 minutes
91.5			>10	91.5-91.9' - Fracture zone, medium to coarse gravel-sized fragments 92.2' - Fracture, horizontal, rough, undulating, 1/4" open		Limestone 91.5-92.5' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak (R2), 15% coverage of voids up to 1/16", trace cavities/fossil molds up to 1/4"x3/16"	
	R12-NQ 5 ft 20%	0	NR			No Recovery 92.5-96.5'	
95 -53.6			>10	96.7-97.2' - Fracture zone, coarse gravel-sized fragments		Limestone 96.5-96.7' - Same as 91.5-92.5' 96.7-97.2' - very pale orange, (10YR 8/2), fine grained, mild HCl reaction, medium strong (R3)	R12: 6 minutes
			NR			No Recovery 97.2-97.9'	Driller's Remark: Rock fragments stuck in core barrel at 98.0'; removed barrel to clear, resumed coring 98.0-101.5'
	R13-NQ 5 ft 86%	35	1	98.1' - Fracture, 10 deg, rough, undulating, open		Limestone 97.9-99.3' - Same as 96.7-97.2' except 2 large cavities (3-7/8"x3/8") at 98.9-99.2'	Core loss assumed to be 97.2-97.9'; lithologic description intervals adjusted accordingly
100			>10	98.6' - Fracture, horizontal, smooth, undulating, 1/4" open			



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
 WATER LEVELS : 0.5 ft bgs on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-58.6			>10		Limestone 99.3-101.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak (R2), 15% coverage of voids to 1/16", trace casts/cavities to 3/8x1-3/16"	R13: 15 minutes	
101.5		1	99.7-99.9' - Fracture zone, gravel-sized fragments 100.3' - Fracture, 30 deg, rough, undulating, tight 101.9' - Fracture, horizontal, rough, undulating, 1/8" open				
	R14-NQ 5 ft 80%	28	>10		No Recovery 105.5-106.5'	R14: 9 minutes	
105		3	102.8-102.9' - Fracture zone, gravel-sized fragments 103.1' - 30 deg, rough, undulating, 1/8" open 103.1-103.4' - Fracture, vertical, rough, undulating, 1/8" open 103.4' - Fracture, horizontal, rough, undulating, 1/4" open 103.8' - Fracture, 40 deg, rough, undulating, 1/8" open				
-63.6			NR		Limestone 106.5-109.2' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, weak (R2), 10% coverage of voids up to 3/16", trace cavities 3/8"x2-3/8"	R15: 5 minutes	
106.5		17	>10	104.0' - Fracture, 40 deg, rough, undulating, 1/8" open 104.2' - Mechanical break 104.5' - Fracture, 10 deg, rough, undulating, 1/8" open 104.8-105.0' - Fracture zone, coarse gravel-sized fragments 105.1-105.3' - Fracture, 60 deg, rough, undulating, tight 106.5-107.4' - Fracture zone, gravel-sized fragments 107.5-107.6' - Fracture, 60 deg, rough, undulating, 1/8" open 108.4' - Fracture, horizontal, rough, undulating, open 108.7-109.2' - Fracture zone, gravel-sized fragments			
110	R15-NQ 5 ft 54%		NR		No Recovery 109.2-111.5'	R15: 5 minutes	
-68.6		15	>10	111.6-111.7' - Fracture zone 112.1-112.2' - Fracture zone			
			0		Limestone 111.5-112.6' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, weak (R2), 10% coverage of voids up to 1/16", single 1-9/16"x1-9/16" cavity at 111.9', deep spherical cavity (1-3/16" diameter) at 112.1' No Recovery 112.6-116.5'	R16: 3 minutes	
115	R16-NQ 5 ft 22%		NR				
-73.6			0		Well Graded Sand (SW) 116.5-117.5' - grayish orange, (10YR 7/4), wet, loose, fine to coarse grained, mild HCl reaction, trace nonplastic fines, all carbonate material		
116.5			>10	116.5-117.5' - unconsolidated silts/sands 117.8' - Fracture, 80 deg, rough, undulating, tight 118.0-119.5' - Fracture zone or mechanical break			
			>10		Limestone 117.5-118.1' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, weak (R2), trace voids to 1/16"		
120	R17-NQ 5 ft 64%		1				



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 on 11/13/07 START : 11/12/2007 END : 11/14/2007 LOGGER : P. De Sa'rego

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-78.6			NR	119.5' - Fracture, horizontal, rough, undulating, open	Limestone 118.1-119.5' - Same as 117.5-118.1' except extremely weak (R0) 119.5-119.7' - Same as 117.5-118.1' No Recovery 119.7-121.5' Limestone 121.5-124.4' - very pale orange mottled with medium light gray, (10YR 8/2 with N6), fine grained, mild HCl reaction, weak (R2), 10% coverage of voids up to 3/16" at 121.5-122.5', 10% fossil casts (up to 3/16"x3/8") at 123.7-123.9' No Recovery 124.4-126.5'	R17: 7 minutes	
121.5			3	121.7' - Fracture, horizontal, rough, undulating, open			
	R18-NQ 5 ft 58%		4	122.35' - Fracture, horizontal, rough, undulating, open			
			0	122.4' - Mechanical break 122.85' - Fracture, horizontal, rough, undulating, open			
125			NR	123.0-123.1' - Fracture, 60 deg, rough, undulating, 1/8" open 123.1-123.2' - Fracture, 70 deg, rough, undulating, open			
-83.6			NR	123.3' - Fracture, 60 deg, rough, undulating, open			
				123.6' - Mechanical break			
				124.0' - Mechanical break			
						Bottom of Boring at 126.5 ft bgs on 11/14/2007	R18: 9 minutes Total Depth of boring 126.5'



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-07	SHEET 1 OF 5
SOIL BORING 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
 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 : 3.5 ft bgs on 11/27/07 START : 11/16/2007 END : 11/27/2007 LOGGER : P. De Sa'rego, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
42.0	0.0	1.4	SS-1	1-1-2 (3)	Poorly Graded Sand With Organics (SP) 0.0-1.4' - moist, very loose, brownish gray (5YR 8/1) from 0.0-0.5', very light gray (N5) from 0.5-1.4', fine silica sand, trace nonplastic fines, 20% roots/organic matter over 0.0-0.5'		
	1.5						
5	5.0	0.8	SS-2	2-1-1 (2)	Poorly Graded Sand With Silt (SP-SM) 5.0-5.8' - grayish orange, (10YR 7/4), wet, very loose, no HCl reaction, fine silica sand, 5-10% nonplastic fines		
37.0	6.5						
10	10.0	1.3	SS-3	8-3-6 (9)	Limestone Fragments With Silty Sand 10.0-11.3' - very pale orange, (10YR 7/4), silty sand is wet, loose, moderate HCl reaction, fine to coarse sand-sized, 35-40% low plastic fines, all carbonate, 70% fine to coarse gravel-sized limestone fragments, 30% silty sand		Advanced 15.0' NW casing
32.0	11.5						
15	15.0	1.0	SS-4	2-2-2 (4)	Silty Sand (SM) 15.0-16.0' - yellowish gray, (5Y 8/1), wet, very loose, strong HCl reaction, 20% fines, fine to coarse sand-sized grains, all carbonate materials including one limestone fragment (1") subrounded to subangular		Continue drilling 11/27/07 Driller's Remark: 10:08 water level at 3.5' below ground surface
27.0	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-07	SHEET 2 OF 5
SOIL BORING 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
 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 : 3.5 ft bgs on 11/27/07 START : 11/16/2007 END : 11/27/2007 LOGGER : P. De Sa'rego, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.0	20.0	1.4	SS-5	2-3-50/5.5 (53/11.5)	Sandy Clay (CH) 20.0-20.85' - transitions from light bluish gray to light gray, (5B 7/1 to N7), moist, medium stiff, medium to high plasticity, moderate HCl reaction, 20-25% very 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	Tricone bit (3-7/8") SS-5A from 20.0-20.85' SS-5B from 20.85-21.35'	
	21.5						
25 17.0	25.0	1.5	SS-6	2-15-31 (46)	Sandy Lean Clay (CL) 25.0-25.4' - mottled light bluish gray and grayish yellow, (5B 7/1 and 5Y 8/4), wet, stiff, medium plasticity, slow dilatancy, mild to moderate HCl reaction in grayish yellow areas, 20% very fine to fine silica sand, 10% fine to medium carbonate sands 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	SS-6A from 25.0-25.4' SS-6B from 25.4-26.45'	
	26.5						
30 12.0	30.0	1.0	SS-7	7-12-22 (34)	Silty Sand (SM) 30.0-31.0' - grayish yellow, (5Y 8/4), moist, dense, mild HCl reaction, fine to coarse sand-sized, 30-35% nonplastic fines, 10-15% fine gravel-sized limestone fragments, all carbonate materials		
	31.5						
35 7.0	35.0	0.7	SS-8	18-50/3 (68/9")	Sandy Silt (ML) 35.0-35.7' - Same as 30.0-31.0' except nonplastic, rapid dilatancy, 35-40% fine to coarse sand-sized		
	35.8						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-07	SHEET 3 OF 5
SOIL BORING 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
 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 : 3.5 ft bgs on 11/27/07 START : 11/16/2007 END : 11/27/2007 LOGGER : P. De Sa'rego, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
							6"-6"-6" (N)
2.0	40.0	1.4	SS-9	19-26-50/5 (76/11)	Sandy Silt (ML) 40.0-41.4' - grayish yellow, (5Y 8/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 40-45% fine to coarse sand-sized, 5% fine gravel-sized limestone fragments, carbonate materials		
	41.4						
45	45.0	0.0	SS-10	50/0.5 (50/0.5")	Limestone Fragments 45.0-45.05' - about ten limestone fragments (<1/4") recovered Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Hard at 44.5' Switch to rock coring at 45.0'
-3.0	45.0						
50							
-8.0							
55							
-13.0							
60							



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
 WATER LEVELS : 3.5 ft bgs on 11/27/07 START : 11/16/2007 END : 11/27/2007 LOGGER : P. De Sa'rego, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-3.0	45.0 R1-NQ 1.5 ft 67%	67	0		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'	13:45 Begin rock coring R1: 7 minutes	
46.5	R2-NQ 5 ft 55%	55	3		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) No Recovery 49.25-56.5'	R2: 7 minutes	
50 -8.0	R3-NQ 5 ft 0%	0	NR		Limestone 56.5-58.1' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y8/4), fine to medium grained, mild to moderate HCl reaction, extremely weak to weak (R0 to R2), highly fossiliferous (90% casts and molds <1/16"-3/16"), voids (<1/16") over 20-30% of 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'	Driller's Remark: 51.5-56.5' soft Started to get soft at 50.0'	
55 -13.0	R4-NQ 5 ft 72%	32	1		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	R3: 2 minutes	
56.5	R5-NQ 5 ft 94%	18	3			R4: 4 minutes	
60 -18.0			2				
61.5			2				
65			1				



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
 WATER LEVELS : 3.5 ft bgs on 11/27/07 START : 11/16/2007 END : 11/27/2007 LOGGER : P. De Sa'rego, T. Borton

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-23.0	66.5 R6-NQ 5 ft 96%	3	0	64.3' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/2"	Limestone 62.2-63.3' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, very weak (R1), fossiliferous (casts and molds), voids (up to <1/16") over 5-10% of surface Sandy Silt (ML) 63.3-64.0' - Same as 61.5-62.2' Limestone 64.0-66.2' - Same as 62.2-63.3' except transitions from extremely weak to very weak (R0 to R1) at 64.3' No Recovery 66.2-66.5' Limestone 66.5-71.3' - yellowish gray, (5Y 7/2), fine to medium grained, mild HCl reaction, very weak (R1) with zones of weak (R2) rock from 67.1-67.6', 68.1-69.25', and 70.35-71.3', variable voids (<1/16"-3/16") over 10-20% of surface, fossiliferous casts and molds (10-15%), trace organics No Recovery 71.3-71.5' Limestone 71.5-76.25' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), very fine to medium grained, mild HCl reaction, very weak (R1), voids (up to <1/16") over 5-10% of surface, fossiliferous (casts and molds) <5%, extremely weak (R0) from 72.5-73.1' with a trace of fines No Recovery 76.25-76.5' Bottom of Boring at 76.5 ft bgs on 11/27/2007	R5: 9 minutes	
		NR	2	64.8' - Mechanical break, 70-80 deg, rough, undulating, tight			
			2	65.0' - Bedding plane or mechanical break, <5 deg, rough, undulating, tight			
			3	65.5' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight			
			1	66.7' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight			
70			1	67.15' - Mechanical break or bedding plane, <5 deg, rough, planar, tight			
-28.0			1	67.8' - Bedding plane, <5 deg, rough, undulating, tight			
			1	68.0' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight			
			1	68.15' - Fracture, 5-10 deg, rough, undulating, tight			
			1	69.3, 70.2' - Bedding plane (2), <5 deg, rough, planar, tight			
	71.5 R7-NQ 5 ft 95%	NR	0	70.8' - Fracture, 20-30 deg, rough, undulating, tight	R6: 8 minutes		
			1	72.95' - Bedding plane, <5 deg, rough, undulating, tight			
			>10	73.75-73.95' - Fracture zone, one large fragment 2-1/2" with small fragments <3/4", subrounded to subangular			
75			1	74.15' - Bedding plane, <5 deg, rough, undulating, tight			
-33.0			2	74.4' - Bedding plane or mechanical break, <5 deg, rough, undulating, tight			
	76.5	NR	75.15' - Bedding plane or mechanical break, <5 deg, rough, undulating, open <1/16"	R7: 11 minutes Total depth is 76.5'			
			NR		75.5-75.6' - Fracture, <5 deg, rough, undulating, open 1.0" with one large fragment		
			NR		75.95' - Mechanical break or bedding plane, <5 deg, rough, undulating, open <1/16"		



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-08	SHEET 1 OF 4
SOIL BORING LOG		

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.2	0.0	1.1	SS-1	1-2-2 (4)	Topsoil 0.0-0.1' - dark gray to grayish black, (N3 to N2) Poorly Graded Sand With Organics (SP) 0.1-1.1' - dark gray to medium light gray with depth, (N3 to N6), moist, very loose, very fine to fine grained, 25% organics, rootlets decreasing with depth, sand is silica		Begin drilling 11/15/07, 09:00
5 37.2	1.5	6.5	SS-2	2-2-3 (5)	Silty Sand (SM) 5.0-6.1' - light olive brown, with <5% very light gray mottling throughout, (5Y 5/6 with N8), moist to wet, very loose, fine grained, no HCl reaction, 19% medium plasticity fines, trace iron concretions, sand is silica		
10 32.2	5.0	11.5	SS-3	4-6-14 (20)	Silt (ML) 10.0-11.0' - grayish yellow, (5Y 8/4), wet, very stiff, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 10-15% very fine to medium sand-sized, all carbonate material		
15 27.2	15.0	15.4	SS-4	50/5 (50/5")	Silt (ML) 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		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-08	SHEET 2 OF 4
SOIL BORING LOG		

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
22.2	20.0	1.3	SS-5	26-33-50/4 (83/10")	Silt (ML) 20.0-21.25' - Same as 15.0-15.42' except grayish yellow to yellowish gray, (5Y 8/4 to 5Y 8/1)		09:44 Installing casing to 20.0'
	21.3						
25	25.0						
17.2	25.6	0.4	SS-6	24-50/1.5 (74/7.5")	Silt With Sand (ML) 25.0-25.4' - grayish yellow to yellowish gray, (5Y 8/4 to 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	31.5	1.5	SS-7	17-34-51 (85)	Sandy Silt (ML) 30.0-31.5' - dark yellowish orange, (10YR 6/6), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 35% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, moderate to strong HCl reaction in fragments, all carbonate materials		
35	35.0						
7.2	35.3	0.0	SS-8	50/3 (50/3")	No Recovery 35.0-35.3' few limestone fragments <1/4", subangular, moderate to strong HCl reaction		Driller's Remark: Hard drilling at 34.0'; alternating hard/soft zones similar to elsewhere on site
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-08	SHEET 3 OF 4
SOIL BORING LOG		

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	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
2.2	40.0	1.2	SS-9	23-29-50 (79)	Sandy Silt (ML) 40.0-41.2' - yellowish gray to light olive gray, (5Y 7/2 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 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		Stop SPT sampling at 41.5' Changing to rock coring
45 -2.8							
50 -7.8							
55 -12.8							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: CT-08	SHEET 4 OF 4
ROCK CORE LOG		

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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
41.5	R1-NQ 5 ft 82%	0	0		Limestone 41.5-45.6' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), very weak (R1) at 45.1-45.6', trace voids up to 1/16", a 3/8"x3/8" cavity is at 43.3' and a 2"x1-3/16" cavity is at 44.9' No Recovery 45.6-46.5'	Begin rock coring at 41.5' R1: 40 minutes	
45 -2.8		1	1	43.05' - Fracture or mechanical break, horizontal, rough, undulating, <1/8" open			
		1	1	43.9' - Fracture, 30 deg, rough, undulating, black staining over 100% of surface, open			
		2	2	45.1-45.2' - Fracture, 45 deg, rough, undulating, 1/8" open			
46.5		NR	NR	45.4' - Fracture, 30 deg, rough, undulating, 1/8" open			
	R2-NQ 5 ft 90%	3	3	46.6' - Fracture, 10 deg, rough, undulating, open	Limestone 46.5-51.0' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, weak (R2), becoming very weak to weak rock at 49.8-51.5', trace voids up to 3/16" throughout run, 15% voids to 1/8" from 49.4-49.8', 10% cavities up to 1"x3/8" from 49.4-49.8' No Recovery 51.0-51.5'	R2: 12 minutes Total depth of boring 51.5', on 11/15/07 at 16:00 Recovery and RQD criteria met 11/16/07 at 08:15, water level is 5.0' below ground surface	
		>10	>10	47.05' - Fracture, 30 deg, rough, undulating, 1/8" open			
		0	0	47.2' - Fracture, 30 deg, 1/8" open, fine gravel-sized fragments			
50 -7.8		2	2	47.55' - Fracture, 10 deg, rough, undulating, tight			
		0	0	47.55-47.95' - Fracture, vertical, rough, undulating, 1/8" open			
	NR	NR	47.95-48.35' - Fracture zone, fine gravel-sized fragments				
			49.8' - Fracture or mechanical break, horizontal, rough, undulating, tight				
51.5			50.5' - Mechanical break		Bottom of Boring at 51.5 ft bgs on 11/15/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01	SHEET 1 OF 6
SOIL BORING LOG		

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
 WATER LEVELS : 3.0 ft bgs on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
40.8	0.0	0.8	SS-1	1-1-3 (4)	Poorly Graded Sand W/ Organics (SP) 0.0-0.55' - very light gray to dark yellowish brown, (N8 to 10YR 4/2), moist, very loose, very fine to fine grained, 10% organic matter, less with depth, trace nonplastic fines, silica sand Silty Sand (SM) 0.55-0.85' - dark yellowish orange, (10YR 6/6), moist, very loose, very fine grained, less than 20% fines, 5% organics, silica sand	Boring offset 11.5' SE of staked location due to fallen tree at location. Rapid, easy drilling. Water encountered at 3.0' below ground surface. Wood at 3.0' in mud pit.	
	1.5						
5 35.8	5.0	0.8	SS-2	5-8-8 (16)	Sand (SP) 5.0-5.8' - very light gray, (N8), wet, medium, very fine grained, trace nonplastic fines, trace very fine grained black particles		
	6.5						
10 30.8	10.0	1.2	SS-3	5-6-7 (13)	Clayey Sand (SC) 10.0-11.2' - yellowish gray, (5Y 7/2), wet, medium, very fine to fine grained, 30% moderate plastic fines, silica sand		
	11.5						
15 25.8	15.0	1.2	SS-4	8-8-10 (18)	Clayey Sand (SC) 15.0-16.2' - Same as 10.0-11.2' except 4" sandy clay lens (CH) at 15.6-15.9', moderate plasticity		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01	SHEET 2 OF 6
SOIL BORING LOG		

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
 WATER LEVELS : 3.0 ft bgs on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
20.8	20.0	0.4	SS-5	4-4-5 (9)	Clayey Sand (SC) 20.0-20.45' - light olive green, (5Y 6/1), wet, loose, very fine to fine grained, 40% low to moderate plasticity fines, silica sand	Rapid, easy drilling. SS-5 is less plastic than SS-3 and SS-4	
	21.5						
25	25.0	1.3	SS-6	5-5-6 (11)	Silty Sand (SM) 25.0-26.3' - Same as 20.0-20.45' except 25-30% low plastic fines		
15.8	26.5						
30	30.0	1.2	SS-7	3-4-4 (8)	Silty Sand (SM) 30.0-31.2' - Same as 25.0-26.3' except 40-45% nonplastic to low plastic fines		
10.8	31.5						
35	35.0	0.4	SS-8	5-3-4 (7)	Organic Soil With Sand (OH) 35.0-35.2' - grayish black, (N2), moist, firm, high plasticity, slow dilatancy, 20% very fine to fine silica sand, trace limestone rounded pebbles Silty Sand (SM) 35.2-35.4' - light olive gray, (5Y 6/1), wet, loose, very fine to fine grained, 30% low plastic fines, silica sand, <1/2" thick organic clay (OH) seam at 35.35'	Slightly slower drilling.	
5.8	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01	SHEET 3 OF 6
SOIL BORING LOG		

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
 WATER LEVELS : 3.0 ft bgs on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
0.8	40.0	0.9	SS-9	48-48-50/4 (100)	Silt With Sand (ML) 40.0-40.9' - olive gray, (5Y 3/2), moist, hard, low plasticity, rapid dilatancy, moderate HCl reaction, <20% fine to medium-sized limestone fragments, trace fine gravel-sized limestone		Hard, slow drilling. No chatter.
	41.3						
45	45.0	0.7	SS-10	50-50/3 (100")	Sandy Silt (ML) 45.0-45.65' - olive gray, (5Y 3/2), moist, hard, low to moderate plasticity, rapid dilatancy, moderate HCl reaction, 25-30% fine sand-sized limestone fragments		Very light, intermittent chatter.
-4.2	45.8						
50	50.0	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 moderate plasticity, moderate HCl reaction, <30% limestone lenses, 35% fine to coarse sand-sized limestone fragments		
-9.2	50.7						
55	55.0	0.8	SS-12	48-50/5.5 (100")	Silt With Sand (ML) 55.0-55.8' - light olive gray, (5Y 5/2), moist to wet, hard, low plasticity, rapid dilatancy, moderate HCl reaction, 20% fine to medium sand sized, 40% organics as seams <1/4" thick and laminations, black (N1)		100% circulation loss. Removed NWJ rod and 6" tri-cone, set HW casing to 59.0' below ground surface. Regain 100% circulation at 57.5' below ground surface with HW casing. Stop drilling at 17:30 5/22/07 after setting the casing
-14.2	56.0						
	60.0	0.1	SS-13	50/1.5 (50/1.5")	Limestone Fragments 60.0-60.1' - light olive gray, (5Y 5/2), moderate HCl reaction, fragments <1" diameter, voids <1/16" over 40% of surface		
	60.1						
60					Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log		



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01	SHEET 4 OF 6
ROCK CORE LOG		

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 on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
-19.2	60.0 R1-NQ 1 ft 40%	40	0		Limestone 60.0-60.4' - yellowish gray, (5Y 7/2), fine grained, weak to moderate HCl reaction, weak (R2), voids 1/16" over 50% of surface, poorly fossiliferous, few cavities <1/4" diameter No Recovery 60.4-61.0' Limestone 61.0-62.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 20-30% of surface, trace cavities <1/4" diameter, poorly fossiliferous, trace organics, trace silts at 62.4', possible soil zone at 62.4-66' No Recovery 62.4-66.0'	Continue drilling at 0800 5/23/07, water level at 2.2' below ground surface. Clean out HW casing to 59.0' below ground surface, tri-cone with 3-7/8" bit to 60.0' Light Chatter Remove AWT rod and 3-7/8" tri-cone Set NQ tooling to 60.0' Advance HW casing to seat in top of rock at 60.0' R1: 25 seconds R2: 7 minutes	
65 -24.2	61.0 R2-NQ 5 ft 28%	9	>10	61.1, 61.3' - Fracture or mechanical break, <10 deg, rough, undulating, open <1/2" 61.4, 61.65, 61.7, 61.75, 61.8, 61.85' - Fractures or mechanical break, 30 deg and 40 deg, rough, undulating, tight, open <1/4" 61.9' - Fractures or mechanical break, horizontal, rough, undulating, tight, open <1/4" 62.2' - Mechanical break			
65 -24.2	66.0 R3-NQ 5 ft 67%	25	4	66.35' - Mechanical break or fracture, 60 deg, rough, undulating, tight, open <1/4" 66.45' - Mechanical break or fracture, vertical, rough, undulating, tight 66.6' - Fracture or mechanical break, 50 deg, rough, undulating, open <1/4" 66.95' - Fracture or mechanical break, horizontal, rough, undulating, open <1/4" 67.7-69.6' - poorly indurated silts and limestone fragments (8")	Limestone 66.0-67.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 30-40% of surface, many cavities <1/4" diameter, moderately fossiliferous with molds <1/4" diameter Silt And Limestone Interbeds (ML) 67.7-70.45' - yellowish gray, (5Y 7/2), hard, fine to medium grained, strong HCl reaction, very weak (R1), limestone interbeds are 1" thick, partial no recovery in interval 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'	Driller's Remark: 100% circulation loss at 68.0' R3: 5 minutes	
70 -29.2	71.0 R4-NQ 5 ft 48%	34	0	69.9' - Fracture or mechanical break, 80 deg, rough, undulating, tight 70.45-71.0' - poorly to moderately indurated silt (1")			
75 -34.2	76.0 R5-NQ 5 ft 60%	28	3	73.85' - Bedding plane (3), horizontal, smooth, undulating, tight, 3+ bedding plane fractures in indurated silts/extremely weak limestone 74.9-75.05' - Fractures or mechanical break (4), rough, undulating, intersecting angles 75.7-75.8' - Fractures or mechanical break (3), 50 deg, rough, undulating, tight, 3 intersecting fractures 76.0-76.15' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 76.45' - Fractures or mechanical break (2), 45 deg, rough, undulating, tight 76.8' - Fractures or mechanical break (4), 70 deg, rough, undulating, tight, open <1/4" 77.75-78.0' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter	Limestone 73.6-73.85' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak (R0), laminated 73.85-76.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, strong to medium strong (R4 to R3), voids <1/16" over 30-40% of surface, few cavities <1/2" diameter, poorly fossiliferous 76.0-78.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong to strong (R3 to R4), strengthening with depth, voids <1/16" over 30-40% of surface, variable, few cavities <1/4" diameter, poorly fossiliferous No Recovery 78.0-80.0'	R4: 3 minutes	
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01
SHEET 5 OF 6	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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 on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION		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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-39.2			NA		Fat Clay (CH) 80.0-80.3' - high plasticity, no to slow dilatancy, strong HCl reaction, <10% limestone fragments of medium sand-sized, calcareous clay Limestone 80.3-81.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids <1/16" over <10-30% of surface, increasing with depth, no cavities <1/2" diameter, poorly fossiliferous 81.0-83.25' - very light gray to moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained, medium strong to strong (R3 to R4), voids <1/16" over <5-30% of surface, variable, many cavities <1/2"x1-1/2" diameter, 80% (with secondary recrystallized infill), trace organics, poorly fossiliferous Carbonate Silt (ML) 83.25-83.35' - very light gray to moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained, low to moderate plasticity, rapid to moderate dilatancy, strong HCl reaction Limestone 83.35-85.7' - very light gray to moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), strengthening with depth, voids <1/16" over 15-30% of surface, few cavities <1"x1/2" diameter, with partial secondary recrystallized infill, poorly fossiliferous, trace laminated organics No Recovery 85.7-86.0' Limestone 86.0-90.6' - yellowish gray to dark yellowish brown, (5Y 7/2 to 10YR 4/2), 5b 7/1, fine to medium grained, moderate to weak HCl reaction, weak to strong (R2 to R4), mottled light bluish gray (5B 7/1) at 86.0-87.8', voids <1/16" over 20-30% of surface, many cavities, <2" diameter, poorly to moderately fossiliferous, 1/2" carbonate silt lens at 87.8', trace laminated organics No Recovery 90.6-91.0'	R5: 4 minutes	
81.0	R6-NQ 5 ft 94%	70	5	80.9-81.0' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 81-81.1' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2" diameter 81.45' - Fracture or mechanical break, <10 deg, rough, undulating, 3+ gravel sized fragments <1/2" diameter, open <1/2" 81.75' - Fracture or mechanical break, 40 deg, rough, undulating, open <1/2"		R6: 5 minutes	
85 -44.2			>10	84.95' - Mechanical break or fracture, <10 deg, rough, undulating, tight		R7: 4 minutes	
86.0			NR	85.15' - Fracture or mechanical break, <10 deg, rough, undulating, open <1/4"			
86.0			>10	86.8' - Fracture or mechanical break, <10 deg, rough, undulating, open <1/2"			
86.0			>10	86.9-87.05' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2" diameter			
86.0	R7-NQ 5 ft 92%	50	1	87.45, 87.8, 88.05, 89.2' - Fracture or mechanical break, <10 deg, rough, undulating, 1/2" silt lens at 87.8', <1/4" gaps			
86.0			3	88.5' - Mechanical break, for hardness test			
86.0			2	89.55, 90.0, 90.2, 90.35' - Mechanical break or fractures, <10 deg, rough, undulating, fractures through cavities, open <1"			
86.0			NR				
86.0			0	92.35, 92.55' - Mechanical break or fractures, <10 deg, rough, undulating, tight, open <1/4"			
86.0	R8-NQ 5 ft 100%	64	0				
86.0			1	94.95, 95.05, 95.1, 95.65' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight	R8: 5 minutes		
86.0			3				
86.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-01	SHEET 6 OF 6
ROCK CORE LOG		

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 on 5/22/07 START : 5/22/2007 END : 5/23/2007 LOGGER : R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					Limestone 91.0-93.3' - pale yellowish brown, (10YR 6/2), strong HCl reaction, medium strong (R3), 20% voids <1/8", many fossil molds up to 1/2" (many elongate), highly fossiliferous 93.3-96.0' - yellowish gray, (5Y 7/2), very fine grained, very strong HCl reaction, weak to medium strong (R2 to R3), 0-5% 1/16" voids (increase in voids to 10% at end of core 95.9-96.0'), zones of very weak rock (R1) at 93.3-93.5', 93.85-94.2', and 94.55-94.85' Bottom of Boring at 96.0 ft bgs on 5/23/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-02	SHEET 1 OF 3
SOIL BORING LOG		

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
 WATER LEVELS : 1.0 ft bgs on 04/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
41.3	0.0	1.2	SS-1	1-2-2 (4)	Topsoil (OL/OH) 0.0-0.2' - grayish black, (N2), moist Poorly Graded Sand With Organics (SP) 0.2-0.6' - medium gray, (N5), moist, very loose, very fine to fine grained, 5% nonplastic fines, 10% organics, roots, sand is silica 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		
	1.5						
5	5.0						
36.3		0.8	SS-2	6-7-7 (14)	Poorly Graded Sand (SP) 5.0-5.8' - white, (N9), wet, medium dense, very fine to fine grained, trace nonplastic fines, trace black particles, sand is silica		
	6.5						
10	10.0						
31.3		1.2	SS-3	5-4-4 (8)	Sandy Lean Clay (CL) 10.0-11.2' - greenish gray w/ pale green and olive gray with pale green and olive gray mottling, (5GY 6/1, 10G 6/2, and 5Y 3/2), wet to moist, stiff, low to medium plasticity, slow dilatancy, 40% very fine silica sand		Driller's Remark: Hard drilling at 12.0'
	11.5						
15	15.0						
26.3		1.3	SS-4	7-4-15 (19)	Sandy Silt And Limestone (ML) 15.0-16.3' - grayish yellow, (5Y 8/4), wet, very stiff, low plasticity, rapid dilatancy, mild to moderate HCl reaction, 35-40% fine to coarse sand, 20% fine to coarse gravel-sized limestone fragments; carbonate, all carbonate		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-02	SHEET 2 OF 3
SOIL BORING LOG		

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
 WATER LEVELS : 1.0 ft bgs on 04/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.3	20.0	1.2	SS-5	42-50-38 (88)		Driller's Remark: 22.5' got hard, then began soft drilling within next few inches
	21.5					
25	25.0	0.0	SS-6	50/2 (50/2")		
16.3	25.2			No Recovery 25.0-25.2'		
30	30.0	1.3	SS-7	22-22-12 (34)		Driller's Remark: 27.5' soft drilling to 30.0' Driller's Remark: Hard again at 34.5'
11.3	31.5					
35	35.0	0.1	SS-8	50/1.5 (50/1.5")		
6.3	35.1			Limestone Fragments 35.0-35.1' - light olive gray to moderate olive brown and gray yellowish fragments, (5Y 5/2 to 5Y 4/4 and 5Y 8/4), olive colored fragments have 10-15% black particles, disc shaped Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log		
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-02	SHEET 3 OF 3
ROCK CORE LOG		

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
 WATER LEVELS : 1.0 ft bgs on 04/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
6.3	35.0	96	1	35.95' - Fracture, 60 deg, rough, undulating, tight 36.6' - Mechanical break, horizontal, rough, undulating, tight	Limestone 35.0-39.8' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), decreasing to very weak (R1) below 38.5', 5-20% voids <1/16", poorly fossiliferous (clasts up to 3/16"), trace yellowish gray (5Y 7/2) mottling, secondary recrystallization	Driller's Remark: 100% circulation R1: 6 minutes	
	0						
	0						
	0						
	0						
40 1.3	40.0		NR				
	R2-NQ 5 ft 90%	86	2	40.5' - Fracture or mechanical break, 60 deg, rough, undulating, tight 40.6' - Fracture or mechanical break, 70 deg, rough, undulating, tight 41.4' - Fracture or mechanical break, 0-10 deg, rough, planar, tight 42.0-42.2' - Fracture zone 42.4' - Mechanical break, horizontal, rough, undulating, tight	No Recovery 39.8-40.0' Limestone 40.0-41.5' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, very weak (R1), 5-10% voids <1/16", non-fossiliferous, transitional to 41.0-44.5' - light olive gray, (5Y 5/2), fine grained, moderate to strong HCl reaction, very weak (R1), 15-40% voids <1/16" and increasing to <3/16" with depth, poorly fossiliferous with increasing cavities with depth (up to 1/2" elongate), secondary recrystallization No Recovery 44.5-45.0' Bottom of Boring at 45.0 ft bgs on 4/20/2007	Driller's Remark: Maintained full circulation R2: 4 minutes Total Depth at 45.0' on 4/20/07	
			1				
			>10				
			0				
			0				
45 -3.7	45.0		NR				



PROJECT NUMBER: 338884.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
 WATER LEVELS : 1.5 ft bgs on 3/24/07 START : 3/24/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.0	0.0	1.2	SS-1	1-2-2 (4)	Topsoil 0.0-0.55' - dark gray to grayish black, (N3 to N2), 20-25% fine to coarse gravel sized roots and wood fragments Poorly Graded Sand With Organics (SP) 0.55-1.2' - very light gray, (N8), moist, very loose, very fine to fine grained, 5% nonplastic fines, 15% roots/organics, silica sand	08:45 Start drilling 24" split spoon, using N-rod Driller switches to a 6.0" tricone roller drill bit for run between SS-1 to SS-2 Mix mud (added 3/4 of 50-lb bag quick Gel brand bentonite)	
	1.5						
5 37.0	5.0	0.7	SS-2	6-5-4 (9)	Silty Sand (SM) 5.0-5.7' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, loose, very fine to fine grained, silica sand, 15% nonplastic fines, trace very fine to fine sand-sized black particles		
	6.5						
10 32.0	10.0	1.2	SS-3	11-11-11 (22)	Silt (ML) 10.0-11.2' - grayish yellow, (5Y 8/4), wet, nonplastic, very rapid dilatancy, moderate HCl reaction, 5-10% very fine to fine sand-sized grains, carbonate materials	Driller's Remark: Maintaining full mud circulation	
	11.5						
15 27.0	15.0	1.2	SS-4	18-32-50/4" (82/10")	Silt (ML) 15.0-15.9' - Same as 10.0-11.2' Sandy Silt (ML) 15.9-16.2' - moderate yellow, (5Y 7/6), moist, nonplastic, rapid dilatancy, moderate HCl reaction, similar to 15.0-15.9', 25% fine to coarse sand-sized limestone fragments, all carbonate	Driller's Remark: Spoon unseated before measure of last 6", drilled down to 18.0' to install 20.0' of 6" diameter casing, then switched over to 4-7/8" drill bit and continued to 20.0' to take SS-5 (20.0-21.5') Driller's Remark: Only 15.0' of 6" diameter	
	16.3						
20							



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
 WATER LEVELS : 1.5 ft bgs on 3/24/07 START : 3/24/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
22.0	20.0	0.1	SS-5	50/1 (50/1")	Limestone Fragments 20.0-20.1' - grayish yellow to moderate yellow, (5Y 8/4 to 5Y 7/6), moderate HCl reaction, poorly fossiliferous (molds), trace (1/2") dusky yellowish brown (10YR 2/2) concretions		11:57 at 20.0' currently 15' 6" diameter casing in place, using 5.0' N-rod lengths to advance a 4-7/8" tricone roller drill bit Driller's Remark: Very hard drilling
25.0	25.0						
17.0	25.4	0.4	SS-6	50/5 (50/5")	Limestone Fragments 25.0-25.4' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, fine to coarse gravel-sized limestone fragments, poorly fossiliferous (casts and molds)		
30.0	30.0						
12.0	30.4	0.4	SS-7	50/5 (50/5")	Silt With Sand (ML) 30.0-30.4' - dark yellowish orange, (10YR 6/6), wet, nonplastic, rapid dilatancy, moderate HCl reaction, 20-25% fine to medium sand-sized material, all carbonate Begin Rock Coring at 31.0 ft bgs See the next sheet for the rock core log		Driller's Remark: Hard drilling and a lot of chatter, very slow drilling advancement Driller's Remark: 15:25, set 3' NW casing to 30' then switch to core runs Driller's Remark: 15:33 tape measured depth of boring is 31.0' NQ core barrel assembly NQ drill bit is a hard rock formation drill bit NW casing advancer w/ retractable tricone roller drill bit accessory (serial # 83963-CN) Switch to rock coring at 31.0'
35.0							
7.0							
40.0							



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
 WATER LEVELS : 1.5 ft bgs on 3/24/07 START : 3/24/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
31.0 32.0	R1-NQ 1 ft 20%	0	>10 NR	31.0-31.2' - Fracture zone, fragments of core, disc-shaped		Limestone 31.0-31.2' - grayish yellow mottled with minor light olive brown, (5Y 5/4 with 5Y 5/6), moderate to strong HCl reaction, medium strong (R3), gray staining, poorly fossiliferous (casts), spherical voids (up to 1/16") over 10% of surface No Recovery 31.2-32.0'	R1: 2 minutes	
35 7.0	R2-NQ 5 ft 94%	84	1 2 1 1 0	32.5' - Fracture, 55-90 deg, smooth, undulating, open 1/8" 33.3' - Fracture, 80 deg, smooth, undulating, open 1/8" 33.5' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4" 34.15' - Fracture, 50-60 deg, rough, undulating, tight 35.5' - Bedding plane or mechanical break, horizontal, rough, undulating		Limestone 32.0-36.7' - grayish yellow, (5Y 8/4), very fine grained, strong HCl reaction, poorly fossiliferous with several large (up to 1" elongate) cavities/molds, some with secondary infilling, variable voids (<1/16") over 3-20% of surface increasing with depth, medium strong (R3) from 32.0-34.8', abruptly very weak (R1) below 34.8' No Recovery 36.7-37.0'	R2: 7 minutes	
40 2.0	R3-NQ 5 ft 74%	50	3 1 0 2 NR	37.55' - Bedding plane, horizontal, rough, undulating, open 1/2" 37.7' - Fracture, 60-70 deg, rough, undulating, tight 38.0' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1" 38.8, 39.5, 39.8, 40.0' - Mechanical break (4) 40.25' - Fracture or mechanical break, horizontal, rough, undulating, tight 40.35, 40.6' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight		Limestone 37.0-37.55' - Same as 32.0-36.7' except very weak (R1), voids (<1/16") over 3% of surface 37.55-40.7' - dark yellowish orange, (10YR 6/6), fine grained, moderate HCl reaction, weak (R2), voids (up to 3/16") over 25-35% of surface, trace fine grained organic particles No Recovery 40.7-42.9'	R3: 4 minutes Stop Drilling for the day at 17:00 Driller's Remark: 1.5' below ground surface water level in 6" casing, 08:05 on 3/25/07 will install 6" diameter casing down to 2.0' increasing circulation around 15.0' of 6" diameter casing, will then install 3" NW casing to 41.0'	
45 -3.0	R4-NQ 4.5 ft 80%	0	NA			Sand With Silt (SM) 42.9-46.4' - very pale orange, (10YR 8/2), very fine to fine grained, mild HCl reaction, rounded, clean sands, 10-15% pale yellowish orange (10YR 5/6) fine grained particles, abrupt contact at 46.4'	R4: 8 minutes Core barrel locking during run (possible sands)	
46.5 47.0	R5-NQ 0.5 ft 100%	100	2 3	46.6' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 46.7" - Mechanical break 47.0' - Bedding plane or mechanical break, 40-50 deg, rough, undulating, gray stains on surface, open to tight		Limestone 46.4-46.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), moderately fossiliferous (few molds, mostly casts), voids (<1/16") over 10-15% of surface, trace black particles up to 1/2" (possibly organics) 46.5-47.0' - Same as 46.4-46.5'	Only 4.5' - unable to reach full 5.0' stroke Install 3" NW casing down to 46.0'	
50 -8.0	R6-NQ 4.5 ft 100%	30	>10 >10	47.45' - Fracture or mechanical break, vertical, tight 47.85' - Fracture or mechanical break, horizontal, rough, undulating, tight 48.05' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 48.25, 48.65' - Mechanical break (2)			R5: 2 minutes R6: 9 minutes	



PROJECT NUMBER: 338884.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 on 3/24/07 START : 3/24/2007 END : 3/26/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION						
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS						
55 -13.0	R7-NQ 5 ft 100%	85	>10	49.20' - Fracture or mechanical break, horizontal, rough, undulating, tight 49.25' - Fracture, horizontal and 60-70 deg, rough, undulating, tight 49.9-50.3' - Fracture zone 50.65' - Fracture, 80-90 deg, rough, undulating, tight 50.95-51.5' - Fracture zone or mechanical break, vertical, tight 52.3, 53.0' - Mechanical break (2) 53.15-53.35' - Fracture zone 54.9' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight		Limestone 47.0-51.5' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, weak (R2), very weak (R1) zone at 50.0', spherical voids (1/16") over 20-30% of surface, poorly fossiliferous, casts/molds (up to 1/2"), up to 15% brownish black particles as laminations (up to 1/16" thick) 51.5-56.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild to moderate HCl reaction, weak to medium strong (R2 to R3), spherical voids (up to 1/16") over 5-10% of surface, black laminations (<1/16" thick) across entire interval, trace coarse grained black particles (possible organics) 56.5-57.0' - Same as 51.5-56.5' 57.0-61.35' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, moderate HCl reaction, 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 No Recovery 61.35-62.0'	R7: 16 minutes R8: 1 minute R9: 10 minutes Complete boring 3/25/07, Total Depth 62.0'			
56.5 57.0	R8-NQ 0.5 ft 100%	100	0	57.5, 57.8, 59.0' - Fracture (3), <10 deg, rough, undulating, open 1/4"-1/2"						
60 -18.0	R9-NQ 5 ft 87%	75	2	59.5, 59.6' - Mechanical break (2) 59.95' - Fracture or mechanical break, 25-35 deg, rough, undulating, open 1/2"						
			0	60.35' - Fracture, 20-30 deg, rough, undulating, open 1/8"						
			2	60.8' - Fracture or mechanical break, horizontal, smooth, undulating						
			NR							
62.0									Bottom of Boring at 62.0 ft bgs on 3/26/2007	08:03 3/26/07 water level 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



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-04	SHEET 1 OF 5
SOIL BORING 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
 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 bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
41.9	0.0	0.8	SS-1	2-3-2 (5)	Topsoil (OL) 0.0-0.2' - black, (N1), moist, roots, wood debris Poorly Graded Sand (SP) 0.2-0.8' - medium dark gray, (N4), moist, loose, fine grained, silica sand, 10-15% organic material, roots		Water level: 2.0' below ground surface
5 36.9	1.5						
	5.0						
	6.5	1.0	SS-2	4-4-4 (8)	Poorly Graded Sand (SP) 5.0-5.95' - very light gray grading to light gray, (N8 to N7), wet, loose, fine grained, silica sand, trace nonplastic fines gradually increasing to silty sand (SM) with 25% low plasticity fines		
10 31.9	10.0						
	11.5	1.3	SS-3	5-22-28 (50)	Sand With Limestone (SP) 10.0-10.2' - pale greenish yellow, (10Y 8/2), wet, loose, fine to coarse grained, strong HCl reaction, gravel-sized limestone fragments, 25% fine to coarse sand-sized grains, 15% nonplastic fines Clayey Sand (SC) 10.2-10.35' - pale olive, (10Y 6/2), wet, medium dense, fine to medium grained, strong HCl reaction, 25-30% low plastic fines, carbonate Silt (ML) 10.35-11.3' - moderate yellow and grayish yellow, (5Y 7/6 and 5Y 8/4), wet, nonplastic, rapid dilatancy, mild HCl reaction, carbonate		
15 26.9	15.0						
	16.5	1.2	SS-4	23-33-26 (59)	Silt (ML) 15.0-16.2' - Same as 10.35-11.3' except 5-10% very fine sand-sized grains		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-04	SHEET 2 OF 5
SOIL BORING 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
 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 bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
21.9	20.0	0.3	SS-5	50/3.5 (50/3.5")	Silt (ML) 20.0-20.3' - Same as 15.0-16.2' except 5-10% very fine sand-sized grains, trace medium to coarse sand-sized grains		
25 16.9	25.0	1.2	SS-6	10-13-21 (34)	Silt With Sand And Limestone (ML) 25.0-26.2' - grayish yellow, (5Y 7/2), nonplastic, rapid dilatancy, mild to moderate HCl reaction, 20% fine to coarse sand-sized grains, 15% fine to coarse gravel-sized limestone, carbonate		Driller's Remark: Chatter at 27.5'
	26.5						
30 11.9	30.0	1.5	SS-7	24-32-38 (70)	Silt With Sand (ML) 30.0-31.45' - Same as 25.0-26.2' except 20-25% very fine to fine sand-sized grains, no gravel-sized fragments		
	31.5						
35 6.9	35.0	1.3	SS-8	13-19-14 (33)	Sandy Silt (ML) 35.0-36.3' - light olive brown to moderate olive brown, (5Y 5/6 to 5Y 4/4), wet, low plasticity, rapid dilatancy, mild HCl reaction, 25-30% fine to coarse sand-sized grains, trace fine gravel-sized limestone, carbonate materials		
	36.5						
	40.0	0.1	SS-9	50/1 (50/1")	Limestone Fragments 40.0-40.1' - moderate olive brown to olive brown, (5Y 4/4 to 5Y 3/2), mild HCl reaction, fine gravel-sized fragments		Driller's Remark: Chatter at 38.5'
	40.1						
40							40.0' switch over to HQ rock coring
					Begin Rock Coring at 40.0 ft bgs 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
 WATER LEVELS : 2.0 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
1.9	40.0	40	>10	40.0-41.0' - Fracture zone	Limestone Fragments 40.0-40.4' - grayish yellow, (5Y 7/2), very fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 10-15% of surface No Recovery 40.4-41.0' Limestone 41.0-45.0' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), voids covering 10-15% of surface increasing to 20-30% below 42.5', partially infilled voids (1/4") from 42.2-42.4', 1-3% cavities (up to 1-9/16"), trace fossils 45.0-45.8' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, extremely weak (R0), voids covering 5-10% of surface, many cavities up to 3/8" long, very friable No Recovery 45.8-52.0'	Driller's Remark: Very hard drilling from 40.0-41.5', 42.5' R1: 29 minutes	
	NR		5	41.05' - Fracture, 40-60 deg, rough, planar, open			
	R1-NQ 5 ft 88%		2	41.15' - Fracture, rough, planar and undulating, open			
			3	41.4, 41.5' - Fractures (2), 0-60 deg, rough, undulating, open			
			4	41.3' - Fracture, 0-<5 deg, rough, undulating, open			
				42.45' - Fracture, 0-60 deg, rough, undulating, open			
45	45.0	0	1	42.8' - Fracture, rough, planar to undulating, tight	Poorly Graded Sand (SP) 52.0-53.0' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), wet, loose, very fine to fine grained, strong HCl reaction, 10% silica, 90% carbonate Limestone Fragments 53.0-54.0' - moderate olive brown, (5Y 4/4), mild HCl reaction, very fine to fine gravel, silt to fine sand-sized with up to 1/8" limestone fragments Limestone 54.0-55.0' - moderate olive brown to light olive brown, (5Y 4/4 to 5Y 4/6), mild HCl reaction, extremely weak to very weak (R0 to R1), carbonaceous material covering some surfaces, voids covering 30-40% of surface, infilling with sandy texture, fine gravel-sized rock fragments No Recovery 55.0-58.8'	R1: 29 minutes 45.8-50.0' core fell back into borehole, upon recovering there was no core retrieved because of poor quality of rock and being very friable R2: 3 minutes	
-3.1	R2-NQ 5 ft 16%		NR	43.3' - Fracture, horizontal, rough, undulating, open			
			0	43.65' - Fracture, <5 deg, rough, undulating, open 1/2"-3/4"			
			0	43.9, 44.05, 44.7' - Fractures (3), <5-60 deg, rough, undulating, open			
				44.8, 44.95' - Fractures (2), <5 deg, rough, undulating, open			
				45.8' - Fracture, horizontal, rough, undulating			
50	50.0	0	NR		Poorly Graded Sand (SP) 52.0-53.0' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), wet, loose, very fine to fine grained, strong HCl reaction, 10% silica, 90% carbonate Limestone Fragments 53.0-54.0' - moderate olive brown, (5Y 4/4), mild HCl reaction, very fine to fine gravel, silt to fine sand-sized with up to 1/8" limestone fragments Limestone 54.0-55.0' - moderate olive brown to light olive brown, (5Y 4/4 to 5Y 4/6), mild HCl reaction, extremely weak to very weak (R0 to R1), carbonaceous material covering some surfaces, voids covering 30-40% of surface, infilling with sandy texture, fine gravel-sized rock fragments No Recovery 55.0-58.8'	End 4/3/07 at 50.0' Begin 4/4/07 R5: 6 minutes Driller's Remark: Harder drilling at 54.0' bgs	
-8.1	R3-NQ 5 ft 60%		NA				
			0				
				0			
55	55.0	0	NR		Limestone 54.0-55.0' - moderate olive brown to light olive brown, (5Y 4/4 to 5Y 4/6), mild HCl reaction, extremely weak to very weak (R0 to R1), carbonaceous material covering some surfaces, voids covering 30-40% of surface, infilling with sandy texture, fine gravel-sized rock fragments No Recovery 55.0-58.8'	Driller's Remark: Harder drilling at 54.0' bgs R4: 10 minutes	
-13.1	R4-NQ 5 ft 24%		NR				
			1	58.8' - Fracture, rough, undulating, open			
			>10	59.1' - Fracture, 0-60 deg, rough, undulating, open			
60	60.0						



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

WATER LEVELS : 2.0 ft bgs on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-18.1	R5-NQ 5 ft 74%	28	4	59.4' - Fracture, 0-40 deg, rough, undulating, open	[Symbolic Log Pattern]	Limestone 58.8-59.6' - light olive brown, (5Y 5/6), very fine grained, mild HCl reaction, weak (R2), voids over 1-5% of surface, rare 1/16"-1/8" cavities 59.6-60.0' - Same as 58.8-59.6' except very weak (R1), gravel-sized limestone fragments, with carbonaceous material on 30% of surface 60.0-62.0' - light olive brown, (5Y 5/6), mild HCl reaction, extremely weak (R0), friable, voids over 5% of surface 62.0-63.7' - Same as 60.0-62.0' except moderate HCl reaction, very weak to weak (R1 to R2), thin carbonaceous laminae at 62.4', rare elongated cavities (up to 3/8"x3/16"), trace organics, trace fossils, voids increase from 5-20% where rock is stronger No Recovery 63.7-65.0' Limestone 65.0-67.8' - dusky yellow, (5Y 6/4), fine to very fine grained, voids covering up to 15% surface, rare cavities (up to 1-1/4"), thin discontinuous carbonaceous laminae from 65.0-66.0', variable strength increasing with depth from weak (R2) to medium strong (R3) except extremely weak (R0) from 66.1-66.4', trace organic material No Recovery 67.8-70.0' Limestone 70.0-70.15' - Same as 65.0-67.8' No Recovery 70.15-71.75' Limestone 71.75-75.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong HCl reaction, medium strong (R3), voids (up to 1/16") over 20-40% of surface, several cavities (up to 3/4") covering 1-3% of surface predominantly at 73.6' 75.0-78.2' - Same as 71.75-75.0' except voids below 77.0' decreasing to 18-20% of surface, few elongated cavities (1/4"x1/2"), most with secondary infill, gradual transition to 78.2-79.5'	R5: 5 minutes
65			2	59.6' - Fracture, horizontal, smooth, planar, open			
-23.1			2	60.1' - Fracture, horizontal, rough, planar, open			
65.0			2	60.2' - Fracture, 40 deg, rough, undulating, open			
65.0			NR	60.65' - Fracture, rough, undulating, open			
65.0	17	NR	4	60.9, 61.7' - Fractures (2), <5 deg, rough, undulating, open			
65.0			4	61.9' - Fracture, vertical, rough, tight			
65.0			4	62.1' - Fracture, <5 deg, rough, undulating, open			
65.0			1	62.8, 63.2' - Fractures (2), <5 deg, rough, undulating, open			
65.0			NR	63.7' - Fracture, <5 deg, rough, stepped, open			
65.0	40	NR	4	65.25' - Fracture, <5 deg, rough, undulating, open			
65.0			4	65.35' - Fracture, horizontal, rough, undulating, open			
65.0			0	65.4-65.7' - Fracture, vertical, rough, undulating, open			
65.0			3	65.8' - Fracture, 40 deg, rough, undulating, tight			
65.0			1	66.0-66.4' - Fracture zone			
65.0	86	NR	NR	66.4-66.8' - Fracture, 70 deg, rough, stepped, tight			
65.0			0	66.9' - Fracture, <5 deg, rough, stepped, tight			
65.0			3	67.8' - Fracture, horizontal, rough, stepped, open			
65.0			1	72.4' - Fracture, horizontal, rough, undulating, open			
65.0			1	72.4-72.9' - Fracture, 80 deg, rough, stepped, tight			
65.0	86	NR	2	72.9, 73.4' - Fractures (2), 0-10 deg, rough, undulating, tight to open			
65.0			2	74.1-74.6' - Fracture, 70 deg, rough, stepped, tight			
65.0			1	75.0' - Fracture, 45 deg, rough, undulating			
65.0			1	75.7' - Fracture, <5 deg, rough, stepped, open			
65.0			0	76.6' - Fracture, horizontal, rough, stepped, tight			
65.0	86	NR	3	78.45, 78.55' - Bedding plane (2), horizontal, smooth, undulating to planar, open			
65.0			1	78.9, 79.1' - Fractures (2), 10 deg, rough, undulating, open			
65.0			1	78.9, 79.1' - Fractures (2), 10 deg, rough, undulating, open			
80	80.0					R7: 7 minutes	
80	80.0					R8: 5 minutes	



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 on 3/28/07 START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-38.1	R9-NQ 5 ft 46%	>10		80.0-81.1' - Fractures, 0-90 deg, rough, undulating and stepped, open	78.2 - 79.5' - pale yellowish orange to moderate yellow, (10YR 8/6 to 5Y 7/6), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), dark gray 1/8" gravel in matrix from 78.5-79.0', 5-10% voids from 78.5-79.0' declining to 0% at 79.0', gradual transition to 79.5-80.0' 79.5-80.0' - pale yellowish orange, (10YR 8/6), fine grained, strong HCl reaction, very weak (R1), voids (1/16") over 18% of surface, homogeneous appearance 80.0-80.9' - light olive brown, (5Y 5/6), very fine to fine grained, mild HCl reaction, extremely weak (R0), voids over 30-40% of surface grading into cavities up to 3/8", gravel-sized material Limey Clay (CL) 80.9-81.1' - moderate olive brown, (5Y 4/4), moist, soft, low plasticity, black carbonaceous staining, silty Limestone 81.1-82.3' - Same as 80.0-80.9' except weak (R2), not broken into gravel-sized rock fragments No Recovery 82.3-85.0' Limestone 85.0-89.9' - moderate yellowish brown to yellowish gray with depth, (10Y 5/4 to 5Y 7/2), mild to strong HCl reaction, weak to medium strong (R2 to R3), voids covering 15-40% of surface grading into cavities (up to 1-3/16") with depth, mottled with zones of light limestone becoming more fossiliferous with depth No Recovery 89.9-90.0' Limestone 90.0-90.8' - light olive brown to dusky yellow, (5Y 5/6 to 5Y 6/4), strong HCl reaction, weak (R2), voids over 20-30% of surface, gravel-sized rock fragments (1/4"-2"), highly fossiliferous, black carbonaceous material up to 15-20% of surface No Recovery 90.8-98.5' Limestone 98.5-100.0' - dusky yellow, (5Y 6/4), strong HCl reaction, weak (R2), gravel-sized rock fragments, voids covering 25-40% of surface, highly fossiliferous	R9: 7 minutes	
85		0		85.95' - Fracture, <5 deg, rough, undulating, open			
-43.1		NR		86.6' - Fracture, <5 deg, rough, undulating, tight			
85	R10-NQ 5 ft 98%	1		87.2' - Fracture, 30-40 deg, rough, undulating, open	Driller's Remark: Lost circulation at 87.0'		
-43.1		59		87.4-87.7' - Fracture zone, 60 deg, rough, undulating, tight			
		2		88.45-88.7' - Fracture zone, <5-60 deg, rough, undulating, open			
		2		89.55' - Fracture, horizontal, rough, stepped, open			
		NR		89.7' - Fracture, 80-90 deg, rough, undulating, open			
90	R11-NQ 5 ft 16%	>10		90.0-90.8' - Fracture zone, various orientations	R10: 9 minutes		
-48.1		0					
		NR					
95	R12-NQ 5 ft 30%				R11: 5 minutes		
-53.1		6					
		>10			Driller's Remark: Possible void 95.0 - 96.0'; very soft drilling 96.0 - 98.5', firmer drilling at 98.5'		
		>10		99.0-100.0' - Fracture zone, 0-90 deg, rough, undulating, open			
100					R12: 3 minutes		
					Bottom of Boring at 100.0 ft bgs on 4/4/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-05	SHEET 1 OF 5
SOIL BORING 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
 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 : 2.0 ft bgs on 04/04/07 START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
41.8	0.0	0.8	SS-1	0-0-2 (2) Topsoil (OL) 0.0-0.3' - black, (N1), organics Poorly Graded Sand With Organics (SP) 0.3-0.8' - brownish gray, (5YR 4/1), moist, very loose, very fine to fine grained, no HCl reaction, silica sand, trace nonplastic fines, 20% organics as fines and roots		Water level: 2.0' below ground surface
	1.5					
5	5.0					
36.8		1.3	SS-2	1-0-0 (0) Sandy Lean Clay (CL) 5.0-6.25' - greenish gray, (5G 6/1), moist to wet, very soft, low to medium plasticity, slow to rapid dilatancy, 35-40% very fine silica sand		Weight of hammer for last 12"
	6.5					
10	10.0					
31.8		1.4	SS-3	13-14-22 (36) Silty Sand (SM) 10.0-11.4' - yellowish gray, (5Y 8/1), moist to wet, dense, very fine to coarse grained, low plasticity, very rapid dilatancy, strong HCl reaction, 20-25% low plastic trace fines gravel-sized		Appears to have fossil fragments Driller's Remark: Lost circulation at 12'
	11.5					
15	15.0					
26.8		1.0	SS-4	1-4-26 (30) Silt (ML) 15.0-15.8' - moderate yellow, (5Y 7/6), wet, very stiff, nonplastic, rapid dilatancy, moderate to strong HCl reaction, 10-15% very fine sand-sized, carbonate materials Limestone Fragments 15.8-16.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, fine to coarse gravel-sized		Set 20' HW casing
	16.5					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-05	SHEET 2 OF 5
SOIL BORING 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
 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 : 2.0 ft bgs on 04/04/07 START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
21.8	20.0	0.1	SS-5	50/3 (50/3")	Limestone Fragments 20.0-20.3' - grayish yellow, (5Y 8/4), fine to coarse grained, mild HCl reaction, fine gravel-sized fragments		
25 16.8	25.0	1.1	SS-6	17-26-31 (57)	Sandy Silt With Limestone (ML) 25.0-26.1' - grayish yellow, (5Y 8/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 10% fine to coarse limestone fragments, 35-40% fine to coarse sand-sized, carbonate materials		
30 11.8	30.0	1.5	SS-7	15-17-47 (64)	Sandy Silt (ML) 30.0-31.5' - Same as 25.0-26.1' except mild to moderate HCl reaction, 30% fine to coarse sand-sized, trace gravel-sized		
35 6.8	35.0	1.1	SS-8	34-24-50/2.5 (74/8.5")	Sandy Silt With Limestone (ML) 35.0-36.1' - light olive gray, (5Y 5/2), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 40% fine to coarse sand-sized, 10% fine to coarse gravel-sized limestone fragments, carbonate materials		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-05	SHEET 3 OF 5
SOIL BORING 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
 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 : 2.0 ft bgs on 04/04/07 START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	40.0	RECOVERY (ft) 0.3					
1.8	40.0	0.3	SS-9	50/4 (50/4")	Limestone Fragments 40.0-40.3' - light olive gray, (5Y 5/2), fine to coarse grained, mild HCl reaction Begin Rock Coring at 40.7 ft bgs See the next sheet for the rock core log		
45 -3.2							
50 -8.2							
55 -13.2							
60							



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
 WATER LEVELS : 2.0 ft bgs on 04/04/07 START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
40.7	R1-NQ 1 ft 85%	50	3	40.9' - Fracture, 10 deg, smooth, undulating, tight	Limestone 40.7-41.7' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak (R2), 10-20% void space up to 1/8", trace cavities up to 1/4", moderately fossiliferous (casts/molds) 41.7-43.5' - pale yellowish brown, (10YR 6/2), fine grained, delayed moderate HCl reaction, weak to medium strong (R2 to R3), 15-20% voids up to 1/8", trace cavities up to 3/16", moderately fossiliferous (molds/casts) 43.5-46.1' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), 10% void space up to 1/8", poorly fossiliferous No Recovery 46.1-46.7' Limestone 46.7-50.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), 20-30% voids, trace up to 1/3" long fossil cavities and casts No Recovery 50.5-51.7' Limestone 51.7-53.8' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 10-20% voids up to 1/16" 53.8-56.0' - Same as 51.7-53.8' except moderate yellowish brown, (10YR 5/4) No Recovery 56.0-56.7' Limestone 56.7-61.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 20-25% voids up to 1/8", some laminations	R1: 1 minute	
41.7			0	41.0' - Fracture, 50 deg, smooth, planar, tight			
			5	43.2' - Mechanical break			
	R2-NQ 5 ft 88%	35	>10	43.5-44.5' - Fracture zone (at least 7), tight but weathered fractures with fragmentation			
45			>10	44.5-45.7' - Fracture zone, fragments from 1/8" to 1", subrounded			
-3.2			>10	45.7-46.1' - Fractures (at least 4), 10 deg, open, weathered, with vertical fractures and fragmentation			
			NR	46.7-50.3' - Fracture zone, very soft material			
			>10				
			>10				
50	R3-NQ 5 ft 70%	45	>10				
-8.2			>10				
			NR				
			>10	52.0' - Fracture, 10 deg, rough, undulating, tight			
			>10	52.3-53.0' - Fracture zone, limestone fragments from silt to cobble-sized fragments			
			>10	53.8' - Fracture, 20 deg, rough, undulating, loose			
	R4-NQ 5 ft 86%	75	0	54.1' - Fracture, 25 deg, rough, undulating, tight			
55			0	54.2-54.7' - Fracture zone, 20 deg, same as 52.3-53.0'			
-13.2			NR	55.5' - Mechanical break			
			0				
			1	57.9' - Fracture, 30 deg, rough, undulating, tight			
			>10	59.2' - Fracture, 70 deg, rough, undulating, tight			
60	R5-NQ 5 ft 92%	68	>10	59.5-60.3' - Fracture zone, gravel-sized fragments			
-18.2			>10				



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-05	SHEET 5 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
 WATER LEVELS : 2.0 ft bgs on 04/04/07 START : 4/4/2007 END : 4/4/2007 LOGGER : A. Teal

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
61.7			1		Limestone 60.0-60.3' - dark yellowish brown, (10YR 4/2), fine grained, mild HCl reaction, extremely weak (R0) 60.9-61.0' - Same as 60.0-60.3' 61.0-61.3' - Same as 56.7-61.3' No Recovery 61.3-61.7' Bottom of Boring at 61.7 ft bgs on 4/4/2007	R5: 3 minutes	
			NR			End of boring	



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-06	SHEET 1 OF 4
SOIL BORING LOG		

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
 WATER LEVELS : 2.1 ft bgs on 4/23/07 START : 4/23/2007 END : 4/24/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
41.6	0.0	0.5	SS-1	1-1-1 (2)	Silty Sand (SM) 0.0-0.5' - moderate yellowish brown to olive gray, (10YR 5/4 to 5Y 3/2), moist to wet, very loose, fine grained, no HCl reaction, silica sand, 15% nonplastic fines, mostly organic fines		
	1.5						
5	5.0						
36.6		1.1	SS-2	2-2-1 (3)	Sandy Fat Clay (CH) 5.0-6.1' - pale blue, (5PB 7/2), moist, soft, medium to high plasticity, no dilatancy, no HCl reaction, 35-40% very fine to fine silica sand		
	6.5						
10	10.0						
31.6		1.1	SS-3	11-24-40 (64)	Limestone Fragments 10.0-10.2' - dusky yellow, (5Y 6/4), fine to coarse grained, strong HCl reaction, gravel-sized fragments Silt (ML) 10.2-11.1' - dusky yellow, (5Y 6/4), moist, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 5-10% very fine carbonate sand		Driller's Remark: Stiff at 9.0'
	11.5						
15	15.0						
26.6		1.5	SS-4	22-50/5.75 (72/11.75")	Sandy Silt (ML) 15.0-16.0' - pale yellowish brown, (10YR 6/2), moist, very stiff, low plasticity, rapid dilatancy, moderate HCl reaction, 25% fine grained sand, some appears as silica, (possibly slough), trace fine gravel-sized limestone at 16.0', trace organics, primarily carbonate Silt (ML) 16.0-16.5' - yellowish gray, (5Y 5/2), moist, hard, nonplastic, very rapid dilatancy, moderate HCl reaction, 5-10% very fine grained sand		07:38 water level at 2.1' below ground surface Driller's Remark: 08:00 borehole caved in over night; 15.0-16.0' may include slough accounting for the discrepancy between depth of penetration and recovery length
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-06	SHEET 2 OF 4
SOIL BORING LOG		

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
 WATER LEVELS : 2.1 ft bgs on 4/23/07 START : 4/23/2007 END : 4/24/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
		6"-6"-6" (N)		6"-6"-6" (N)			
21.6	20.0	0.8	SS-5	21-29-3 (32)	Silty Sand And Limestone (SM) 20.0-20.8' - very pale orange, (10YR 8/2), moist, dense, fine to coarse grained, moderate HCl reaction, 60% silty sand and 40% limestone, 30% nonplastic fines, carbonate		
	21.5						
25	25.0	0.6	SS-6	20-8-1 (9)	Silty Sand With Limestone (SM) 25.0-25.6' - grayish orange, (10YR 6/4), moist, loose, fine to coarse grained, moderate HCl reaction, similar to 20.0-20.8', 25% fine to coarse gravel-sized limestone fragments, 35% nonplastic fines, carbonate materials		
16.6	26.5						
30	30.0	1.4	SS-7	6-9-15 (24)	Sandy Silt (ML) 30.0-31.4' - dusky yellow, (5Y 6/4), wet, very stiff, low plasticity, rapid dilatancy, mild to moderate HCl reaction, 35-40% fine to coarse sand, carbonate materials		08:15 Begin drilling to 35.0' During drilling to 35.0' lost circulation at 8:21 - lots of chatter during drilling
11.6	31.5						
35	35.0	0.0	SS-8	50/2 (50/2")	No Recovery 35.0-35.2' Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log		Casing advanced to 35.0' below ground surface
6.6	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-06	SHEET 3 OF 5
ROCK CORE LOG		

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
 WATER LEVELS : 2.1 ft bgs on 4/23/07 START : 4/23/2007 END : 4/24/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
36.0	R1-NQ 5 ft 84%	47	1	36.7, 37.7' - Mechanical break (2)	Limestone 36.0-39.15' - pale olive to light olive 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 dissolution, trace organic features, at 36.7' weak (R2), at 37.7' very weak to weak (R1-R2) 39.15-40.2' - moderate olive brown, (5Y 4/4), moderate HCl reaction, extremely weak (R0), laminar features of olive gray (5Y3/2) No Recovery 40.2-41.0'	10:04 Begin coring R1-NQ	
40 1.6			2	36.9' - Bedding plane, <10 deg, rough, undulating, tight			
			5	37.0' - Fracture, 50 deg, rough, undulating, tight			
			0	37.05' - Fracture, 10-25 deg, rough, undulating, tight			
			NR	38.0-38.3' - Fracture zone, rough, undulating, intersecting bedding plane and high angle fractures, tight 38.5' - Bedding plane, same as 36.9' except open up to 1/2"			
41.0	R2-NQ 5 ft 73%	47	0	38.0-38.3' - Fracture zone, rough, undulating, intersecting bedding plane and high angle fractures, tight	Limestone 41.0-41.85' - Same as 39.15-40.2' except strong HCl reaction 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 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 organics, very similar to 36.0-39.15' 44.6-44.65' - Same as 39.15-40.2' except strong HCl reaction No Recovery 44.65-46.0'	R1: 9 minutes	
45 -3.4			1	42.3' - Fracture, 80 deg, rough, undulating, tight			
			1	43.5-43.8' - Mechanical break			
			1	43.8, 44.1' - Bedding plane (2), 30 deg, rough, undulating, tight			
			NR				
46.0	R3-NQ 5 ft 90%	43	0	46.0-46.3' - Fracture, 50 deg, rough, undulating, tight	Limestone 46.0-46.3' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), fine grained, mild HCl reaction, extremely weak (R0), voids (<1/16") over <5% of surface, trace very fine organics, few organic inclusions up to 1/2", very similar to overlying extremely weak rock (39.15'-40.2') 46.3-48.15' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), moderate to strong HCl reaction, medium strong (R3), 25% fine voids predominantly <1/16", moderately fossiliferous, no longer cavities, trace organics 48.15-49.0' - Same as 46.0-46.3' 49.0-50.35' - Same as 46.0-46.3' 50.35-50.5' - Same as 46.0-46.3' No Recovery 50.5-51.0' Limestone 51.0-52.1' - Same as 46.0-46.3'	R2: 6 minutes	
50 -8.4			2	47.15' - Fracture, 50 deg, rough, undulating, tight			
			1	47.55' - Bedding plane, <10 deg, rough, undulating, open 1/4"			
			2	48.15' - Bedding plane, <5 deg, rough, undulating, tight			
			NR	49.0' - Fracture, 75 deg, rough, undulating, tight			
51.0	R4-NQ 5 ft 100%	17	2	49.7' - Fracture, 50 deg, rough, undulating, tight	R3: 3 minutes		
55 -13.4			1	50.25' - Fracture, same as 49.0'			
			1	52.5' - Bedding plane, <5 deg, smooth, undulating, tight			
			1	52.6' - Fracture, 70 deg, rough, undulating, open 1/8"			
			0	53.4' - Fracture, 50 deg, same as 52.6'			
56.0			0	53.5' - same as 47.55'	R4: 26 minutes		
			0	54.35' - Mechanical break, same as 48.15'			



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-06	SHEET 4 OF 5
ROCK CORE LOG		

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
 WATER LEVELS : 2.1 ft bgs on 4/23/07 START : 4/23/2007 END : 4/24/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
60 -18.4	R5-NQ 5 ft 92%	48	2	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'	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 underlying 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 62.9-64.1' No Recovery 65.95-66.0' Limestone 66.0-67.7' - dark 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 0-10% of surface	R5: 18 minutes	
61.0			1	58.8' - Bedding plane, same as 56.8, except 6" thick silt infill			
			0	60.3' - Bedding plane, smooth, planar, open up to 1/8"			
			NR	61.2' - Mechanical break			
65 -23.4	R6-NQ 5 ft 99%	50	0	62.0, 62.25' - Bedding plane (2), <5 deg, smooth, undulating 62.6' - same as 62.0', except 10 deg 62.9' - same as 62.0'			R6: 14 minutes
			3	63.5' - Bedding plane, 5 deg, smooth, undulating, open up to 1/4"			
			>10	64.1-64.4' - Fracture zone			
			2	65.0, 65.55' - Fractures (2), 80 deg, rough to smooth, undulating			
			NR	65.8, 66.9' - Mechanical break (2)			
66.0			0	67.45' - Bedding plane, 30 deg, open up to 1"			
	R7-NQ 5 ft 96%	92	1	68.4' - Bedding plane, smooth, undulating, open <1/8", associated with organic lamination		R7: 9 minutes	
70 -28.4			0	68.5, 69.4, 70.6' - Mechanical break (3)			
			1	70.3' - Bedding plane, 10 deg			
			NR			13:15 Total depth of hole at 71.0' Note: Used 9 bags of cement (47-lb bags) and 40 gallons of water	
71.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: D-06	SHEET 5 OF 5
ROCK CORE LOG		

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
 WATER LEVELS : 2.1 ft bgs on 4/23/07 START : 4/23/2007 END : 4/24/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					67.7-69.7' - moderate yellowish brown, (10Y 5/4), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 5% of surface, 1/4" cavities at 68.6', weak (R2) rock at 68.5' and 69.4' 69.7-70.8' - Same as 67.7-69.7' except increased variability in voids from 5-30%, alternating very weak (R1) rock to medium strong (R3) rock No Recovery 70.8-71.0' Bottom of Boring at 71.0 ft bgs on 4/24/2007		



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
 WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
40.9	0.0	0.8	SS-1	1-2-3 (5)	Topsoil 0.0-0.3' - black, (N8), organics Silty Sand (SM) 0.3-0.75' - light brown to moderate brown, (5YR 5/6 to 5YR 4/4), moist, loose, very fine to fine grained, 15% nonplastic fines, 5-10% organics		Start drilling at 16:00 on 5/30/07 Water table encountered at 3.2' below ground surface Silica sand
5 35.9	1.5						
	5.0						
	6.5	0.6	SS-2	2-2-3 (5)	Silty Sand (SM) 5.0-5.6' - mottled moderate yellowish brown and pale green, (mottled 10YR 5/4 and 10G 6/2), moist, loose, slow dilatancy, fine silica sand, 17% moderate plasticity fines		
10 30.9	10.0						
	11.5	0.9	SS-3	9-14-24 (38)	Silt With Sand And Limestone (ML) 10.0-10.9' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, moderate to strong HCl reaction in all materials, 15-20% very fine to medium sand-sized, 40% fine to coarse gravel-sized limestone, all material carbonate		Driller's Remark: Lost circulation at 13.0'
15 25.9	15.0						
	16.5	0.6	SS-4	1-1-8 (9)	Sandy Silt And Limestone (ML) 15.0-15.6' - grayish orange, (10YR 7/2), wet, medium stiff, nonplastic, 29% fine to coarse sand, 16% fine to coarse sized limestone		Set HW casing 5/31/07 at 16.0'
20							



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
 WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
20.9	20.0	1.4	SS-5	6-9-13 (22)	[Symbolic Log]	Carbonate material
	21.5					
25	25.0	1.4	SS-6	6-11-15 (26)	[Symbolic Log]	Carbonate material
15.9	26.5					
30	30.0	1.1	SS-7	1-0-9 (9)	[Symbolic Log]	Carbonate material
10.9	31.5					
35	35.0	0.5	SS-8	2-10-8 (18)	[Symbolic Log]	Carbonate material Driller's Remark: Lost circulation at 37.0'
5.9	36.5					
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01	SHEET 3 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
 WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.9	40.0	0.6	SS-9	13-50/4 (63/10")	Interbedded Limestone And Sandy Silt 40.0-40.6' - dark yellowish brown and moderate yellowish brown, (10YR 4/2 and 10YR 5/4), 70% of 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 appearance Begin Rock Coring at 41.0 ft bgs See the next sheet for the rock core log	Driller's Remark: Chatter at 40.0' Carbonate material Begin core at 41.0' 5/31/07, 10:45	
40.8							
45 -4.1							
50 -9.1							
55 -14.1							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01
SHEET 4 OF 13	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION	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.	
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
41.0	R1-HQ 5 ft 70%	63	>10	41.0-41.2' - Fracture zone, rounded to angular limestone rock fragments (gravel size)	[Symbolic Log]	Limestone 41.0-41.4' - coarse gravel (limestone and chert) 41.4-43.0' - pale yellowish brown, (10YR 6/2), dense, very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), cavities up to 2-3/8"-2-3/4"x3/4"-1-3/16", infilled with medium grained vesicular-textured limestone, voids up to 1/16" or less over 1-2% of surface, fossils rare to absent, possibly bioturbated 43.0-44.5' - pale yellowish brown, (10YR 6/2), dense, fine to medium grained, mild to moderate HCl reaction, medium strong to weak (R3 to R2), voids (generally <1/16") over 3-5% of surface grading to 10% with depth, fossils (molds/casts) rare to absent No Recovery 44.5-46.0'	Casing depth 41.0' NR = No Recovery R1: 14 minutes	
45 -4.1			1	41.3' - Fracture, 40 deg, rough, undulating, open				
46.0			1	42.35' - Fracture, horizontal, rough, planar, 3/4" boring in fracture, tight				
46.0			2	43.9' - Fracture, 80 deg, rough, planar, 80% of surface covered by black organic coating <1/16" thick, fracture plane extends from 43.6-44.5'				
50 -9.1	R2-HQ 5 ft 100%	57	NR	44.3' - Fracture, 20-30 deg, rough, stepped, open	[Symbolic Log]	Limestone 46.0-48.5' - Same as 43.0-44.5' except voids increase to 5-8%, cavities common (typically 1/16"x3/16"), fossiliferous (molds/casts) Silty Sand (SM) 48.5-51.0' - grayish orange to dark yellowish brown, (10YR 7/4 to 10YR 6/6), mild HCl reaction, interbedded with clay, carbonate-derived silts/clays/sand-size fragments (cohesive), with some black (N1) carbonaceous/organic laminae/deposits, fossils absent Limestone 51.0-53.8' - moderate yellowish brown, (10YR 5/4), mottled yellowish gray (5y 7/2), fine grained, mild HCl reaction, very weak (R1), voids (up to 1/16"-1/8") over 15-20% of surface, some cavities up to 3/8", some fossil molds/casts, occasionally thinly laminated with black (N1) organic/carbonaceous material No Recovery 53.8-56.0'	R2: 3 minutes R3: 5 minutes	
51.0			4	44.3-44.5' - Fracture, 80 deg, rough, stepped, open				
51.0			0	46.2' - Fracture, 80 deg, rough, planar, thin (<1/16") layer of black (N1) carbonaceous material, open				
55 -14.1			2	46.6' - Fracture zone, 40 deg, very rough, planar, open				
56.0			2	46.7' - Fracture, horizontal, rough, planar, open				
60 -19.1			1	46.9' - Fracture, horizontal, smooth, planar, open				
61.0	R3-HQ 5 ft 56%	42	1	48.7' - Fracture, 10 deg, smooth, undulating, open	[Symbolic Log]	Silty Sand (SM) 56.0-56.6' - Same as 48.5-51.0'	R4: 5 minutes	
55 -14.1			10	48.9' - Fracture, 20 deg, smooth, undulating				
56.0			10	49.3, 49.7' - Fractures (2), horizontal, smooth, undulating, tight				
60 -19.1			NR	50.7' - Fracture, horizontal, smooth, undulating, open				
61.0			1	51.0-51.3' - Fracture zone, rough, stepped, various orientation of fractures, open, gravel to cobble sized limestone rock fragments				
61.0			2	52.2-52.9' - Fracture, 80 deg, rough, undulating, tight				
61.0	R4-HQ 5 ft 80%	42	2	52.4-53.8' - Fracture zone, intersecting fractures from 50 deg to 90 deg, rough, stepped to undulating, tight to open	[Symbolic Log]			
61.0			2	56.3' - Fracture, 10 deg, very smooth, undulating				
61.0			1	56.6-57.0' - Fracture zone, rough, planar to undulating, large coarse gravel to cobble size, low to high angle fracture planes, open				
61.0			1	57.2' - Fracture, 10 deg, rough, stepped, open				
61.0	R4-HQ 5 ft 80%	42	1	57.5-58.0' - Fracture zone, rough, planar to undulating, large coarse gravel to cobble size, low to high angle fracture planes, open	[Symbolic Log]			
61.0			1	58.0' - Fracture, horizontal, smooth, planar, tight, black (N1) carbonaceous film/coating over 90-95% of surface				



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

WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
65 -24.1	R5-HQ 5 ft 70%	45	>10	58.5' - Fracture, 5 deg, smooth, planar, tight, black carbonaceous film/coating over 80% of surface		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 5% of rock surface, some cavities generally 3/8" in diameter or less, numerous thin, wispy, discontinuous black carbonaceous laminae, rare zone of very weak to extremely weak (R1-R0) rock (typically as cavity infilling) No Recovery 60.0-61.0' Limestone 61.0-61.6' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, extremely weak (R0), friable, cavities and voids absent, fossils absent 61.6-64.5' - moderate yellowish brown becoming grayish orange with 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, unevenly distributed, few cavities generally 3/8" or less in diameter, thin black discontinuous carbonaceous laminae common, fossil molds/casts rare to absent No Recovery 64.5-66.0' Limestone 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, 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 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 absent, possible intraclasts of very weak (R1) rock 68.1-69.45' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over 10-15% of rock surface, few cavities (<3/8" in diameter), trace fossil casts/molds	R5: 5 minutes Mast down at 15:15 R6: 4 minutes Core was stuck in core barrel, required all rods to be removed R7: 8 minutes SC-1 collected at 79.7-80.8' R8: 10 minutes	
			1	59.6' - Fracture, 10 deg, rough, undulating to stepped, tight				
			2	61.0-61.6' - Fracture zone, rough, undulating, gravel-sized, angular to subangular limestone fragments, various fracture orientations, open				
			1	61.6' - Fracture, horizontal, rough, undulating, open				
			NR	61.8' - Fracture, 0-90 deg, rough to smooth, stepped, black carbonaceous film over 10%				
66.0				62.4' - Fracture, horizontal, smooth, undulating, tight, dark gray carbonaceous film over 50%				
			>10	63.15' - Fracture, horizontal, rough, undulating, open				
			2	63.7' - Fracture, 60 deg, rough, undulating				
			3	64.1' - Fracture, horizontal, smooth, undulating				
			1	66.5' - Fracture, 30 deg, rough, stepped, open, silt lining <1/16" thick				
70 -29.1	R6-HQ 5 ft 73%	52		66.5-67.0' - Fracture zone, irregular angles, rock fragments				
			NR	67.0' - Fracture, 0-90 deg, rough, stepped, open				
			NR	67.8' - Fracture, 10 deg, rough, highly undulating to stepped, tight				
			NR	68.1' - Fracture, horizontal, rough, undulating, open				
71.0			3	68.5, 68.75, 69.35' - Fractures (3), 10 deg, very rough, undulating, open				
			1	71.5' - Fracture, 0-45 deg, rough, planar, open				
			NR	71.8' - Fractures (2), 45 deg, smooth, undulating, open				
			NR	71.9-72.2' - Fracture zone, irregular angles				
			NR	72.2' - Fracture, horizontal, smooth, planar, open				
75 -34.1	R7-HQ 5 ft 34%	18						
			3	76.4' - Fracture, horizontal, smooth, planar, open				
			0	76.5' - Fracture, horizontal, rough, undulating, open				
			2	76.7' - Fracture, 0-20 deg, rough, stepped, open				
			0	78.0' - Fracture or mechanical break, horizontal, rough, undulating, tight				
			0	78.9' - Fracture, 30 deg, rough, planar				
80 -39.1	R8-HQ 5 ft 98%	83						
			1					
81.0								



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

WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -44.1	R9-HQ 5 ft 68%	46	NR 1 1 2 0	80.85' - Fracture, 40 deg, rough, planar, tight, <1/16"-sized black "peppering" of amorphous mineral over 8-10% of fracture plane surface 81.5' - Fracture, horizontal, rough, undulating, open 82.5' - Fracture, 75 deg, rough, undulating, fracture plane extends from 82.2-82.8' 83.1' - Fractures, 0-40 deg, rough, stepped, open 83.3' - Fracture, 0-90 deg, rough, stepped, open	Limestone 69.45-69.65' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), fossils absent, voids <1/16" over <1%, cavities absent, some very thin dark gray laminations No Recovery 69.65-71.0' Limestone 71.0-72.7' - light olive gray to moderate yellowish brown, (5Y 5/2 to 10YR 5/4), fine grained, mild to moderate HCl reaction, strong (R4), voids 1/16" over 10-15% of surface, some cavities generally 3/8" in diameter or less, sparsely fossiliferous casts/molds No Recovery 72.7-76.0' Limestone 76.0-78.5' - mottled yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids typically 1/16" or less over 5-10% of rock surface, some cavities generally 3/8" in diameter or less but up to 1-3/16" in diameter (filled with silty to sandy carbonate grains), fossils rare as molds/casts, <1% of surface having a patina of white very fine grained carbonate staining/film 78.5-79.5' - grayish orange, (10YR 7/4), fine grained, none to mild HCl reaction, extremely weak (R0), very friable, voids <1/16" over <1%, cavities absent, non-fossiliferous, rare intraclasts (<1/4") of grayish very weak to weak(R1 to R2) limestone Silt (ML) 79.5-79.7' - grayish orange, (10YR 7/4), mild HCl reaction, carbonate derived	R9: 6 minutes	
90 -49.1	R10-HQ 5 ft 86%	80	1 3 1 0 0 NR	86.85' - Fracture, 45-60 deg, rough, undulating, several intersecting fracture planes, open 87.1' - Fracture, 50 deg, rough, planar, conical 87.45' - Fracture, horizontal, rough, undulating, tight 87.85, 88.6' - Fractures (2), horizontal, smooth, planar		Start drill at 07:30 on 6/3/07 Driller's Remark: Lost circulation at 87.0'	
95 -54.1	R11-HQ 5 ft 96%	83	1 0 2 2 1 NR	91.3' - Mechanical break 91.7' - Fracture, horizontal, smooth, planar, tight 93.6' - Fracture, 20 deg, rough, planar, coarse gravel sized fragments at interface, open 93.95, 94.25' - Fractures (2), horizontal, rough, undulating, open 94.95' - Fracture, horizontal, rough, planar, open	78.5-79.5' - grayish orange, (10YR 7/4), fine grained, none to mild HCl reaction, extremely weak (R0), very friable, voids <1/16" over <1%, cavities absent, non-fossiliferous, rare intraclasts (<1/4") of grayish very weak to weak(R1 to R2) limestone Silt (ML) 79.5-79.7' - grayish orange, (10YR 7/4), mild HCl reaction, carbonate derived	Cavity filled with organic material at 92.1'	
100 -59.1	R12-HQ 5 ft 88%	18	7 >10 >10 >10 2 NR	95.25' - Fracture, horizontal, rough, undulating to stepped, open 96.4' - Fracture, horizontal, rough, undulating, open 96.45' - Fracture, vertical, smooth, planar, open 96.5' - Fracture, <5 deg, smooth, undulating, open 96.6' - Fracture, 60 deg, smooth, slightly undulating, tight 96.7' - Fracture, horizontal, rough, planar to stepped, open 96.8' - Fracture, horizontal, rough, planar, open	79.7-80.9' - grayish orange to very pale orange, (10YR 7/4 to 10YR 8/2), very fine grained, moderate HCl reaction, medium strong to weak (R3 to R2), voids 1/16" or less over 1-3% of rock surface, cavities rare, trace fossil casts/molds No Recovery 80.9-81.0' Limestone 81.0-81.5' - Same as 79.7-80.9'	Cavities at 94.4-94.6' and 94.6-94.8' R11: 6 minutes SC-2 collected at 99.0-99.9' R12: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01	SHEET 7 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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -64.1	R13-HQ 5 ft 100%	53	10 >10 >10 10 5	96.9' - Fracture, vertical, smooth, planar, open 97.0' - Fracture, horizontal, rough, stepped, open 97.0-98.0' - Fracture zone, rough, undulating to stepped, vertical to subvertical, open 98.23' - Fracture, horizontal, smooth, undulating to planar, open 98.5' - Mechanical break 98.6-99.0' - Fracture zone, 0-90 deg, rough, stepped to undulating, open 99.9-100.05' - Fracture zone, rough, planar, various fracture orientations, gravel sized rock fragments, open 100.2' - Fracture, horizontal, smooth, planar, open 100.5' - Fracture, horizontal, rough, planar to stepped, open 101.4' - Fracture, 0-45 deg, smooth, planar, open 101.6-101.75' - Fracture zone, 0-50 deg, rough, undulating, open 102.8' - Fracture or mechanical break, horizontal, smooth, planar 102.8-103.1' - Fracture zone, gravel-sized rock fragments, multiple fracture orientations 103.13, 103.2, 103.3, 103.45' - Bedding plane (4), horizontal, rough, planar to stepped, discontinuous, open 103.5' - Fracture, 45 deg, smooth, planar, tight 103.8, 103.9' - Fractures (2), horizontal, rough, planar 104.1, 104.2' - Fractures (2), horizontal, rough, stepped, open 104.7' - Fracture, rough, cone-shaped 104.7-104.75' - Fracture zone, gravels sized fragments of irregular shape and fracture orientation 104.83' - Fracture, horizontal, smooth, planar 105.2, 105.45, 105.57, 105.7, 105.9' - Bedding plane (5), horizontal, rough, planar to stepped, open 106.3' - Fracture, horizontal, smooth, planar 106.4-106.5' - Fracture zone, horizontal, planar, multiple fragments 106.55' - Fracture, horizontal, smooth, planar 106.6' - Fracture, horizontal, smooth, planar 106.9' - Mechanical break, horizontal, smooth, planar 107.4' - Fracture, horizontal, rough, planar 107.5' - Fracture, horizontal, rough, undulating 107.8' - Fracture or mechanical break, horizontal, smooth, undulating 107.9' - Fracture or mechanical break, horizontal, smooth, undulating 108.0-108.3' - Fracture zone, horizontal, smooth, planar, bedding plane separations at 108.0, 108.1, 108.2, 108.25, 108.3'		81.5-83.5' - moderate yellowish brown with yellowish gray limestone interbeds, (10YR 5/4 with 5Y 7/2), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), HCl reaction strong where patina of very fine grained limestone coats core surface, abundant fractures, breccia-like features (with possible intraclasts) common from 82.7-83.5', voids up to 1/16" over 15-20% of surface, cavities common (up to 2-3/8"-2-3/4" in length, 1-9/16"-2" wide and extending 3/4"-1-3/16" into core), fossiliferous (casts/molds) 83.5-84.4' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (1/16" or less) unevenly distributed over 15% of rock surface, cavities (<3/16"), fossil molds/casts rare to absent No Recovery 84.4-86.0' Limestone 86.0-87.4' - dusky yellow with yellowish gray interbeds, (5Y 6/4 with 5Y 7/2), fine to very fine grained, weak to medium strong (R2 to R3), voids 1/16" or less over 25-30% of rock surface, some cavities up to 1-3/16"-1-9/16" x 3/4"-1-3/16", very fine grained limestone from 86.7-86.8', very fine grained intraclast from 87.0-87.4' (subangular, up to 1/2"-3/4"), some fossil molds/casts 87.4-88.6' - very light gray, (N8), fine grained, strong HCl reaction, very weak (R1), voids (1/16" or less) over 3-5% of rock surface, cavities rare (typically 3/8"x3/16"), trace fossil molds and trace echinoderms 88.6-90.3' - variegated pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" over 5-8%, cavities (typically 3/8"x3/16"), fossiliferous (molds/casts), echinoderms, becomes coarse grained with depth from 90.2-90.3' and extremely weak rock (R0) with some black carbonaceous material No Recovery 90.3-91.0'	08:30 rig stops for water refill SC-3 collected at 101.75-102.8' R13: No time recorded 09:30 begin drill, add 1 bag mud Driller's Remark: Drill chatter throughout run R14: 4 minutes SC-4 collected at 110.15-111.0' R15: 5 minutes R16: 4 minutes
110 -69.1	R14-HQ 5 ft 92%	53	4 4 >10 4 0 NR				
115 -74.1	R15-HQ 5 ft 76%	15	>10 >10 >10 >10 NR				
120 -79.1	R16-HQ 5 ft 96%	55	4 4 0 4 6				



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

WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
125 -84.1	R17-HQ 5 ft 40%	0	>10 >10 NR		Limestone 91.0-92.0' - very light gray, (N8), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" or less over 10-15% of rock surface, several cavities typically 3/8"x3/16", trace fossil molds/casts with occasional echinoderm fossils 92.0-93.5' - Same as 88.6-90.3' except trace black carbonaceous/organic discontinuous laminae/cavity infilling, intraclasts (up to 1-9/16"-2", subrounded) common 93.2-93.5' 93.5-95.45' - yellowish gray to very light gray, (5Y 8/1 to N8), fine to medium grained, strong HCl reaction, very weak (R1) rock from 93.5-94.3', becoming weak rock (R2) from 94.3-95.2' and returning to very weak rock (R1) from 95.2-95.45', voids (1/16" or less) over 3-5% of rock surface and unevenly distributed, some cavities up to 1-3/16"-1-9/16"x3/8" over 2-3% of rock surface, chalk-like texture when scraped with pocket knife, fossil molds/casts rare to absent	R17: 4 minutes	
130 -89.1	R18-HQ 5 ft 4%	0	0 NR		Peat 95.45-95.7' - black to grayish black, (N1 to N2), no HCl reaction, firm to stiff, interlaminated with some very weak limestone Limestone 95.7-95.8' - Same as 93.5-95.45' except very weak (R1), friable No Recovery 95.8-96.0' Limestone 96.0-100.4' - yellowish gray, (5Y 8/1), strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" or less over 5-10% of rock surface, cavities typically 3/8" in diameter over 3-4%, trace fossil molds/casts No Recovery 100.4-101.0' Limestone 101.0-106.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), fine to medium grained, strong HCl reaction, weak (R2), chalky texture when scraped with pocket knife, voids up to 1/16" over 10% or less of rock surface, some cavities up to 3/8" in diameter, some echinoid fossils in addition to sparse occurrences of molds/casts 106.0-110.6' - Same as 101.0-106.0' except echinoderm fossils common from 106.0-107.4' No Recovery 110.6-111.0'	Driller's Remark: Large rock fragment jammed in tip of core barrel. 10:30 drilling suspended to fix wireline spool One rock fragment 2.4" long was all that was recovered during coring. No void reported. Driller's Remark: Strong chatter R18: 3 minutes	
135 -94.1	R19-HQ 5 ft 92%	22	8 5 >10 6 >10 NR		117.1' - Fracture, 20 deg, rough, stepped, conical, open 117.32' - Fracture, horizontal, rough, undulating, open 117.9' - Mechanical break 118.5' - Mechanical break 119.3' - Fracture, horizontal, rough, undulating, open 119.4' - Fracture, horizontal, rough, stepped, open 119.72' - Fracture, horizontal, rough, stepped, open 119.8' - Fracture, horizontal, rough, planar, open 120.05, 120.12, 125.25, 120.45, 120.65' - Fractures (5), horizontal, rough, planar to undulating, open 120.75' - Fracture, 0-60 deg, rough, stepped, open 121.0' - Fracture zone, unconsolidated, 1/2"-4" fragments 131.1, 131.3, 131.35, 131.4, 131.45, 131.55, 131.7, 131.8' - Fractures (8), horizontal, rough, planar to undulating, open 132.25, 132.3, 132.38, 132.8, 132.9' - Fractures (5), horizontal, rough, planar to undulating, open 133.1, 133.25, 133.4, 133.5, 133.6, 133.7, 133.8, 133.85' - Fractures (8), horizontal, rough, planar to undulating, open 133.85-134.15' - Fracture zone, 0-90 deg, rough, undulating to stepped, open	Driller's Remark: Strong chatter from 133.0-136.0' Many fractures resulted from breakage along weak bedding planes when removing sample from core barrel R19: 5 minutes	
140 -99.1	R20-HQ 5 ft 66%	0	10 10 7 0 NR			R20: 4 minutes	



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

WATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
145 -104.1	R21-HQ 5 ft 88%	62	1	134.15, 134.25, 134.4, 134.5, 134.6, 134.8, 135.85' - Fractures (7), horizontal, rough, planar to stepped, open		Limestone 111.0-113.7' - Same as 101.0-106.0' except echinoid fossils rare to absent 113.7-114.45' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, extremely weak (R0), voids/cavities absent, fossils absent 114.45-114.8' - Same as 111.0-113.7' No Recovery 114.8-116.0' Limestone 116.0-119.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), chalky texture when scraped with knife, voids (<1/16" over 1-2% of surface, few cavities (generally 3/8" in diameter or less), fossils rare to absent (trace echinoderms) 119.7-120.8' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, very weak (R1), voids <10%, some cavities (typically <3/8" in diameter), fossiliferous (molds/casts), pelecypods, gastropods, some echinoderms (fossil hash) No Recovery 120.8-121.0' 121.0-123.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), very friable, 40-50% fine to medium sand-sized grains grading to gravel-sized carbonate No Recovery 123.0-126.0' Limestone 126.0-126.2' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), fossiliferous (echinoderms, fossil hash) No Recovery 126.2-131.0' Limestone 131.0-135.6' - Same as 111.0-113.7' No Recovery 135.6-136.0' Limestone 136.0-137.9' - Same as 131.0-136.0' 137.9-138.2' - olive gray, (5Y 3/2), fine to medium grained, strong HCl reaction, very weak (R1), thinly laminated 138.2-138.5' - Same as 136.0-137.9' 138.5-138.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), laminated, voids (<1/16") 5-8% irregularly distributed over core surface, few cavities <1/16" in diameter, fossils (casts/molds) rare to absent 138.7-139.3' - Same as 121.0-123.0' No Recovery 139.3-141.0'	SC-5 collected at 144.5-145.4' R21: 5 minutes	
		4	135.07' - Fracture, horizontal, rough, planar, open					
		4	135.07-135.7' - Fracture zone, multiple coarse gravel to cobble-sized fragments, various fracture plane orientations					
		2	135.7' - Fracture, horizontal, rough, stepped, open					
		0	135.85' - Fracture, horizontal, rough, planar, open					
		NR	136.1, 136.2, 136.3' - Fractures (3), horizontal, rough, planar, open					
150 -109.1	R22-HQ 5 ft 88%	68	>10	136.4-136.6' - Fracture zone, bounded by planar to undulating, rough, open bedding planes		R22: 7 minutes		
		2	136.8, 136.9' - Fractures (2), horizontal, rough, undulating, open					
		2	137.05, 137.2, 137.35, 137.6, 137.75, 137.8, 137.85, 138.0, 138.1, 138.2, 138.25, 138.35, 138.5, 138.55' - Fractures (14), horizontal, rough to smooth, planar to undulating, open					
		2	138.5' - Mechanical break					
		0	138.85' - Fracture, horizontal, rough, planar					
		NR	141.4' - Fracture or mechanical break, horizontal, rough, planar					
155 -114.1	R23-HQ 5 ft 96%	80	2	142.0' - Fracture, horizontal, rough, planar		Start drill at 12:15 Add 1/2 bag mud SC-6 collected at 151.3-152.35' Driller's Remark: Drilling in fourth gear, consistent chatter throughout run		
		3	142.0-142.12' - Fracture zone					
		0	142.33, 142.40' - Fracture or mechanical break (2), horizontal, rough, planar					
		0	142.9' - Fracture or mechanical break, horizontal, rough, planar					
		0	143.0' - Fracture, horizontal, rough, undulating, coarse gravel-sized rock fragments on bottom face					
		NR	143.3' - Fracture, vertical, rough, stepped, tight					
160 -119.1	R24-HQ 5 ft 80%	55	1	143.4' - Fracture, horizontal, rough, stepped, open		Large cast/void at 154.85', 155.2', 155.8' R23: No time recorded Lost 2.0' due to having to break 2.9' long piece to box SC-7 collected at 158.3-159.1' R24: 4 minutes		
		1	143.7' - Fracture, 80 deg, rough, planar, tight					
		1	144.1' - Fracture, 80 deg, rough, stepped, (intersects fracture at 143.7')					
		1	144.50' - Fracture or mechanical break, horizontal, rough, undulating					
		1	146.4' - Fracture, horizontal, rough, undulating, organic staining on bottom face					
		NR	146.4-146.6' - Fracture zone, smooth, planar, coarse gravel to cobble-sized fragments					
		1	146.6' - Fracture, horizontal, rough, undulating, tight					
		2	146.6-147.0' - Fracture, vertical, rough, planar, tight, fracture plane extends from					
		NR	147.0' - Fracture or mechanical break, horizontal, smooth, planar, open					
		NR	147.0-147.2' - Fracture zone, rough, planar to stepped, multiple fractures, open, angular gravel size fragments					



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01	SHEET 10 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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
165 -124.1	R25-HQ 5 ft 96%	75	3	147.7' - Fracture or mechanical break, horizontal, smooth, planar, tight		Limestone 141.0-141.35' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), medium to coarse grained, strong HCl reaction, very weak (R1), voids (1/16") over 5-7% of surface, some cavities up to 3/8" in diameter, fossiliferous (echinoderm parts), molds/casts sparse 141.35-142.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" over 10% of surface, few cavities generally 3/8" or less in diameter, fossiliferous (echinoids), thinly laminated with wispy, discontinuous, black (N1) carbonaceous/organic material 142.0-143.05' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, weak (R2), chalk-like texture when scraped with knife, irregular to undulating core surface, voids (<1/16" or less) over 1-2%, cavities rare, fossils (molds/casts) difficult to discern 143.05-145.4' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), voids (1/16" or less) over 3% or less of rock surface, cavities common up to a few inches in length (possibly bioturbated), fossiliferous (mostly casts), some pelecypod molds/casts No Recovery 145.4-146.0' Limestone 146.0-146.4' - Same as 143.05-145.4' 146.4-148.1' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thin black wispy organic/carbonaceous laminations, voids (<1/16") over 1-3% of surface non-uniformly distributed, few cavities, fossil molds/casts rare to absent 148.1-149.0' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), voids (<1/16") over <1% of surface, cavities (<3/16") rare to absent, fossils absent	R25: 4 minutes	
			3	148.4' - Fracture or mechanical break, 0-50 deg, smooth, planar, tight				
			1	148.9' - Fracture, 70 deg, smooth, undulating, tight, fracture plane extends from 148.5-149.5'				
			2	149.3' - Fracture, horizontal, very rough, undulating, tight				
			3	149.55' - Fracture, vertical, rough, undulating to stepped, tight				
			NR	149.8' - Fracture, 0-90 deg, rough, stepped, tight				
			8	151.2' - Fracture, 10 deg, rough, stepped, tight				
			6	151.3' - Fracture, 10 deg, smooth, undulating, tight				
			9	152.6' - Fracture, horizontal, smooth, undulating, tight				
			2	152.9' - Fracture, horizontal, smooth, undulating, open				
170 -129.1	R26-HQ 5 ft 68%	18	NR	152.97' - Fracture, horizontal, rough, undulating			Loud drill chatter throughout, especially at 167.0'	
			NR	156.35' - Fracture, 10 deg, rough, undulating, open			Large cavity >3/4" at 168.0', 169.2'	
			NR	157.9' - Fracture, horizontal, smooth, undulating, open				
			NR	158.0' - Fracture, 10 deg, smooth, planar			R26: 4 minutes	
			NR	158.3' - Mechanical break				
			2	159.4, 159.7' - Fractures (2), horizontal, rough, planar, open				
			5	161.35' - Fracture, horizontal, rough, undulating, tight				
			10	161.6' - Fracture or mechanical break, horizontal, smooth, planar, open				
			>10	161.95' - Fracture or mechanical break, horizontal, rough, planar, open				
			10	162.2' - Fracture, horizontal, rough, undulating, open				
175 -134.1	R27-HQ 5 ft 96%	57	NR	162.45, 162.55' - Fracture or mechanical break (2), horizontal, rough, planar, open			R27: 4 minutes	
			NR	163.5' - Mechanical break				
			NR	163.65' - Fracture or mechanical break, horizontal, smooth, planar, open				
			NR	164.0' - Fracture or mechanical break, horizontal, smooth, planar, open				
			NR	164.0-164.1' - Fracture zone				
			NR	164.1' - Fracture, 10 deg, rough, planar				
			NR	165.15, 165.2, 165.25' - Fractures (3), horizontal, smooth, planar, open				
			NR	166.10, 166.4, 166.42, 166.45, 166.55, 166.6, 166.7, 166.8' - Bedding plane (8), horizontal, rough, planar, open				
			NR	167.15, 167.2, 167.25, 167.3, 167.35, 167.95' - Bedding plane (6), horizontal, smooth, planar to stepped			Drill chatter at 178.0'	
			NR	168.0' - Fracture, 10 deg, rough, undulating, open				
180 -139.1	R28-HQ 5 ft 16%	0	NR	168.2, 168.25, 168.3, 168.35, 168.4, 168.5, 168.6, 168.9' - Mechanical break (8), horizontal, smooth, planar			R28: 4 minutes	
			NR	168.0' - Fracture, 10 deg, rough, undulating, open				



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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
185 -144.1	R29-HQ 5 ft 26%	15	2 2 NR		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 HCl 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 HCl 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 HCl 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 HCl 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, (10YR 6/6), medium to coarse grained, strong HCl 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 HCl 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	
186.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01	SHEET 12 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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone 161.0-161.6' - Same as 159.25-160.0' 161.6-162.5' - very pale orange, (10YR 8/2), coarse grained, strong HCl 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 HCl 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 mottling is wavy and discontinuous, some echinoids and fossil molds/casts 164.1-165.8' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl 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 HCl 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 HCl reaction, weak to medium strong (R2 to R3), voids (1/16" or less) over 5-10% of rock surface, cavities (generally 3/16" or less in diameter) over 2-3% of surface, fossil (casts/molds) rare, medium to coarse grained from 174.5-175.3' No Recovery 175.8-176.0'</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-01	SHEET 13 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 ft bgs on 5/30/07 START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone 176.0-176.35' - yellowish gray, (5Y 7/2), fine to very fine grained, mild to moderate HCl reaction, medium 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</p> <p>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</p> <p>No Recovery 176.8-181.0'</p> <p>Limestone 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) rare</p> <p>No Recovery 182.3-186.0' Bottom of Boring at 186.0 ft bgs on 6/3/2007</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 1 OF 11
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
39.8	0.0	1.0	SS-1	1-3-6 (9)	Topsoil (OL) 0.0-0.3' - grayish brown to brownish black, (5YR 3/2 to 5YR 2/1), wood debris and organics Poorly Graded Sand (SP) 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		Water level: 1.5-5.0'
5 34.8	5.0	0.9	SS-2	5-6-5 (11)	Wood Debris And Silty Sand (SM) 5.0-5.95' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), wet, medium dense, 30% nonplastic fines, very fine to fine grained silica sand		
10 29.8	10.0 10.3	0.3	SS-3	50/3.5 (50/3.5")	Silty Sand (SM) 10.0-10.3' - dark yellowish brown, (10YR 6/6), moist, very dense, fine to coarse grained, mild to moderate HCl reaction, carbonate, 48% nonplastic fines, rapid dilatancy, bottom 1" contains fine gravel-sized limestone fragments		
15 24.8	15.0	0.8	SS-4	4-4-5 (9)	Limestone 15.0-15.2' - dark yellowish orange, (10YR 6/6), mild HCl reaction, carbonate materials Silt With Sand (ML) 15.2-15.85' - dark yellowish orange, (10YR 6/1), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCl reaction, carbonate materials, 20-25% fine-grained silica sand		Driller's Remark: 100% fluid loss, no circulation
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 2 OF 11
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
19.8						Install 15' HW casing to seal off flow zone after collecting SS-5: 20.0-21.5' SPT
	21.0					Water level surface
	21.9	0.9	SS-5	20-50/5 (70/11")		05/19/07 07:30 Drilling from 20.0', advance 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
	25.0					
25	25.4	0.3	SS-6	50/5 (50/5")		
14.8						
	30.0					
30	30.3	0.1	SS-7	50/4 (50/4")		
9.8						
	35.0					
35	36.5	1.3	SS-8	29-26-50/6 (76/12)		
4.8						
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 3 OF 11
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
-0.2	40.0	0.2	SS-9	50/4 (50/4")	Limestone 40.0-40.2' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, coarse sand-sized and fine gravel-sized		
45 -5.2	45.0 45.4	0.4	SS-10	50/5 (50/5")	Sandy Silt (ML) 45.0-45.4' - moderate yellowish brown, (10YR 5/4), wet, low plasticity, mild HCl reaction, 44% very fine to medium sand-sized, carbonate materials		
50 -10.2	50.0 50.3	0.3	SS-11	50/4 (50/4")	Limestone 50.0-50.3' - pale yellowish brown, (10YR 6/2), mild HCl reaction, fine gravel-sized Begin Rock Coring at 51.0 ft bgs See the next sheet for the rock core log		Advance HW casing from 20.0-50.0' below ground surface to prevent circulation blow out around pit neck Begin rock coring with NQ wireline tooling from 51' below ground surface
55 -15.2							
60							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
51.0	R1-NQ 5 ft 96%	69	3	51.05, 51.2, 51.4, 52.85, 53.3' - Fractures (5), <10 deg, rough, undulating, no staining or infill, open <1/4"-<1/2"	Limestone 51.0-55.8' - moderate yellowish brown, (10YR 5/4), very fine to medium grained, 51.0-53.5' extremely weak to weak rock (R0 to R2) weakest at 51.0-51.5' and 53.3-53.5', voids <1/16" over 50-60% of surface, highly fossiliferous with many fossil molds/casts <1/2" diameter, few cavities <1/2" diameter 53.5-54.5' extremely weak to very weak (R0 to R1) with depth, voids <1/16" over <20% of surface, no fossils 54.5-55.8' weak to medium strong rock (R2 to R3), voids <1/16" over 40-50% of surface, secondary recrystallized infill over 50% of core zone 53.5-54.5' - extremely weak to very weak (R0 to R1), weaker with depth, voids <1/16" over <20% of surface, no fossils 54.5-55.8' weak to medium strong rock (R2 to R3), voids <1/16" over 40-50% of surface, secondary recrystallized infill over 50% of core zone 54.5-55.8' - weak to medium strong (R2 to R3), voids <1/16" over 40-50% of surface, secondary recrystallized infill over 50% of core zone No Recovery 55.8-56.0' Limestone 56.0-60.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), strong HCl reaction, extremely weak to medium strong (R0 to R3), fine to medium grained, silts increasing with depth, voids 1/16" over 40% of surface, moderately fossiliferous with fossil casts/molds <3/4" diameter, many cavities <1" diameter, 20% of cavities with secondary recrystallized infill No Recovery 60.5-61.0' Limestone 61.0-64.9' - dark yellowish brown to yellowish gray, (10YR 4/2 to 5Y 7/2), very fine to medium grained, moderate to strong HCl reaction, strong (R4) 61.1-64'. At 61.0-61.1' and 64.0-64.9' extremely weak to very weak (R0 to R1), voids <1/16" over 30% of surface, trace fossil molds/casts <1/2, cavities with secondary recrystallized in fill up to 2" diameter; trace organics No Recovery 64.9-66.0'	Begin rock coring at 16:00 with NQ wireline tooling from 51.0' using water only SC-1 collected at 51.85-52.85' R1: 4 minutes R2: 3 minutes SC-2 collected at 62.65-63.65' R3: 5 minutes R4: 3 minutes	
55 -15.2			1				
			10	53.5-53.55' - Soil Seam 53.7, 53.8, 54.05, 54.15, 54.6, 55.15' - Fractures (6), <10 deg, rough, undulating, open <1/4"- <3/4"			
			3				
	1						
56.0	R2-NQ 5 ft 90%	50	NR	56.15, 56.3, 56.43, 56.55, 56.7, 56.9' - Fractures (6), <10 deg, rough, undulating, open <1/2"			
			10	57.40-57.55' - Fracture zone, rough, undulating			
			>5	58.2, 58.45, 59.65' - Mechanical break (3), <10 deg, rough, undulating, tight to open <1/2"			
60 -20.2			2				
			1				
	>10	60.3-60.45' - Fracture zone, rough, undulating, gravel sized fragments <3/4" diameter					
61.0	R3-NQ 5 ft 78%	58	NR	61.0-61.1' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter			
			>10				
			0				
			0				
65 -25.2		4	64.05, 64.3, 64.5, 64.7' - Fractures (4), 40 deg, rough, undulating, tight, open <1/2"				
	NR						
	R4-NQ 5 ft 95%	85	1	66.2, 63.25, 65.1, 65.15, 65.55' - Fractures (5), <10 deg, undulating, smooth to rough, open <1/4"			
			0				
			1				
			0				
70 -30.2		2					
71.0							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
75 -35.2	R5-NQ 5 ft 90%	48	NR 10 1 >10 5 1 NR	71.05, 71.2, 71.65, 71.7' - Fractures (4), <10 deg, rough, undulating, open <1/4"-1/2", few intersecting fractures, 71.65-71.7' 72.4, 73.05, 73.25, 73.65' - Fractures (4), <10 deg, rough, undulating, open <1/4" 73.8-73.9' - Fracture zone, rough, undulating, gravel-sized fragments, <1" diameter 74.3, 74.4, 74.55, 74.7, 74.8, 75.15' - Fractures (6), <10 deg, rough, undulating, except 74.7-70.0' deg intersecting, tight, open <1/4" 75.3' - Clay seam		Limestone 66.0-70.75' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak rock (R2) with extremely weak rock (R0) lenses <0.1' thick rock at 66.2', 67.0', 67.45', 67.65', voids <1/16" over 30% of surface, few cavities <1" diameter, poorly fossiliferous No Recovery 70.75-71.0' Limestone 71.0-75.5' - moderate yellowish brown, (10YR 5/4), very fine to medium grained, moderate to strong HCl reaction, interbedded extremely weak to very weak rock (R0 to R1), with weak to medium strong rock (R2 to R3), voids <1/16" over 0-30% of surface, variable, trace fossil molds, few cavities <1/2" diameter, trace secondary recrystallized infill No Recovery 75.5-76.0' Limestone 76.0-79.9' - moderate yellowish brown to medium light gray, (10YR 5/4 to N6), very fine to medium grained, 76.0-78.3' medium strong to strong rock (R3-R4), void <1/16" over <10-20% of surface increasing with depth, poorly fossiliferous, no cavities, 78.3-78.45' Fat Clay (OH), dark gray (N3), high plasticity, high organic content, no HCl reaction, 78.45-79.9' weak to medium strong rock (R2-R3), fine to medium grained, voids <1/16" over <10-40% of surface, poorly fossiliferous, secondary recrystallized infill of cavities over 40% of surface, strong HCl reaction No Recovery 79.9-81.0' Limestone 81.0-85.8' - pale yellowish brown, (10YR 6/2), very fine to medium grained, weak to medium strong rock (R2 to R3) except 83.4-83.85', grayish black, (N2), extremely weak to very weak rock (R0 to R1) with interbedded organic fat clay seams and laminations, 81.0-83.4' and 83.85-85.8' voids <1/16" over 30-50% of surface, few cavities with secondary recrystallized infill, 2" diameter at 81.9 to 82.0', poorly to moderately fossiliferous with molds <1/2" diameter, trace organics, strong to moderate HCl reaction No Recovery 85.8-86.0'	NQ wireline lowered in boring at 76.0', backhammer 5/19/07 17:15 76.0' Water level at surface R5: 3 minutes 05/20/07 08:00 Continue advancing HW casing from 50.0 to 65.0' 10:30 NQ tooling freed at 76.0' with HW casing at 65.0', continue rock coring from 76.0' SC-3 collected at 77.15-78.3' R6: 4 minutes R7: 5 minutes R8: 4 minutes
80 -40.2	R6-NQ 5 ft 78%	63	>10 10 4 3 NR	76.4, 76.9' - Fracture (2), <10 deg, undulating, smooth to rough, tight, open <1/2" 76.9-77.15' - Fracture zone, rough, undulating, gravel-sized fragments, <1-1/2" diameter 78.45-78.5' - Fractures (3+), rough, undulating, intersecting 78.9, 79.35, 79.45' - Fractures (3), <10 deg, rough, undulating, tight, open <1/4"			
85 -45.2	R7-NQ 5 ft 96%	65	10 3 4 >10 3 NR	81.3-81.45' - Fracture zone (5+ intersecting), rough, undulating 82.0-82.1' - Fracture zone (3+ intersecting), rough, undulating 82.9' - Fracture, 20 deg and 50 deg, rough, undulating, tight 83.4, 83.5, 83.6, 83.65, 83.85' - Fractures, <10 deg, undulating, organic staining, smooth to rough, <1/2" organic clay infill, tight, open <1/2" 84.4-84.7' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter 85.7-85.8' - Fractures (3+), rough, undulating, open <1/2"			
90 -50.2	R8-NQ 5 ft 72%	6	6 6 >10 2 NR	86.3, 86.45, 86.55, 86.6' - Fractures, 40 deg and 60 deg, rough, undulating, open <1/2" 86.8, 86.85, 87.0, 87.2, 87.4, 87.65' - Fractures, <10 deg, rough, undulating, open <1/2" 87.8, 87.95' - Fractures (2), 40 deg and 60 deg, rough, undulating, open <1/4" 88.25-88.65' - Fracture zone, rough, undulating, gravel-sized fragments, <1" diameter 88.85, 89.1, 89.4' - Fractures, 10 deg and 40 deg, rough, undulating, open <1/4"			
91.0							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 1.5 ft bgs on 5/18/07 START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bityel

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
95 -55.2	R9-NQ 5 ft 90%	59	>10 5 0 2 4 NR	91.0-91.4' - Fracture zone, <10 deg, rough, undulating, gravel-sized fragments, no stain or infill, <1" diameter 91.65' - Fracture, <10 deg, rough, undulating, tight 92.2' - Fracture, 40 deg, rough, undulating, tight, open <1/4" 92.6, 92.85, 92.95' - Fractures (3), <10 deg, rough, undulating, silt and/or clay sized infilling, trace of silt infill at 92.6', open <1" 93.4-93.65' - elastic silt (MH) seam 94.55, 95.1' - Fractures (2), horizontal, rough, undulating, 80 deg intervals, open <1/2"		Limestone 86.0-89.6' - yellowish gray, (5Y 7/2), very fine to coarse grained, extremely weak to weak (R0 to R2), voids 1/16" over 20% of surface, poorly fossiliferous 87.8-89.6' - medium gray (N5) to olive gray (5Y 4/1), medium strong to strong rock (R3 to R4), very fine-grained, voids 1/16" over 30-40% of surface, moderately to highly fossiliferous with many fossil molds <1/2" diameter, few cavities <1" diameter, moderate to strong HCl reaction No Recovery 89.6-91.0' Limestone 91.0-93.4' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), very fine to fine grained, medium strong to strong (R3 to R4), 91-93.4' and 93.65-94.5' voids <1/16" over 30% of surface, 91-92.5', 92.65-93.4', 93.65-94.5' no voids, few cavities <1/2" diameter, poorly fossiliferous Elastic Silt (MH) 93.4-93.65' - olive gray, (5Y 4/1), medium plasticity, strong HCl reaction	R9: 7 minutes	
100 -60.2	R10-NQ 5 ft 100%	52	3 3 8 0 6	96.4, 96.5, 96.95, 97.35, 97.6, 97.7, 98.05, 98.2, 98.4, 98.55, 98.65, 98.7, 98.8, 100.4, 100.7, 100.9, 101.05, 101.1, 101.15' - Fractures (19), <10 deg, rough, undulating, tight, open <1/4"		Limestone 94.5-95.5' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over <20% of surface, moderately fossiliferous with molds/casts <1/2" diameter No Recovery 95.5-96.0' Limestone 96.0-101.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to very weak rock (R1 to R2), silt zone from 96.5-96.95', voids <1/16" over <20-30% of surface, moderately fossiliferous, with fossil molds/casts <1" diameter, no cavities Limestone 101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak to weak rock (R0 to R2), voids <1/16" over <20% of surface, poorly fossiliferous, laminated, strong HCl reaction No Recovery 105.95-106.0'	SC-4 collected at 98.85-100.0' R10: 4 minutes	
105 -65.2	R11-NQ 5 ft 99%	16	>10 10 10 >10 10 NR	101.2, 101.25, 101.3, 101.35, 101.4, 101.7, 101.95, 102.45, 102.5, 102.55, 102.6, 102.65, 102.7, 102.75, 103.25, 103.35, 103.4, 103.5, 103.65, 103.7, 103.9, 103.95, 104.0, 104.15, 104.2, 104.3, 104.35, 104.4, 104.45, 104.5' - Bedding plane (30), <10 deg, undulating, smooth to rough, tight, open <1/2"		94.5-95.5' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over <20% of surface, moderately fossiliferous with molds/casts <1/2" diameter No Recovery 95.5-96.0' Limestone 96.0-101.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to very weak rock (R1 to R2), silt zone from 96.5-96.95', voids <1/16" over <20-30% of surface, moderately fossiliferous, with fossil molds/casts <1" diameter, no cavities Limestone 101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak to weak rock (R0 to R2), voids <1/16" over <20% of surface, poorly fossiliferous, laminated, strong HCl reaction No Recovery 105.95-106.0'	R11: 4 minutes	
110 -70.2	R12-NQ 5 ft 100%	62	2 0 >10 10 10	106.1, 106.8, 109.1, 109.25, 109.3, 109.55, 109.7, 109.8, 109.85, 110.3, 110.5, 110.6, 110.65, 110.85, 110.95' - Bedding plane (15), <10 deg, undulating, smooth to rough, tight, open <1/4" 108.1-108.45' - Fracture zone, rough, undulating, gravel-sized fragments, <2" diameter		106.0-101.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to very weak rock (R1 to R2), silt zone from 96.5-96.95', voids <1/16" over <20-30% of surface, moderately fossiliferous, with fossil molds/casts <1" diameter, no cavities Limestone 101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak to weak rock (R0 to R2), voids <1/16" over <20% of surface, poorly fossiliferous, laminated, strong HCl reaction No Recovery 105.95-106.0'	SC-5 collected at 106.85-107.9' R12: 5 minutes	



PROJECT NUMBER: 338884.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 on 5/18/07 START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
115 -75.2	R13-NQ 5 ft 79%	22	>10 >10 >10 >10 NR		Limestone 106.0-111.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl 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 HCl reaction, extremely weak to weak (R0 to R2), laminated, voids 1/16" over <10% of surface, no fossils No Recovery 114.95-116.0' 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	R13: 4 minutes	
120 -80.2	R14-NQ 5 ft 100%	97	1 0 2 0 1		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 No Recovery 125.05-126.0'	R14: 3 minutes	
125 -85.2	R15-NQ 5 ft 81%	70	2 2 0 0 1 NR		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	
130 -90.2	R16-NQ 5 ft 97%	93	2 1 0 0 1		Limestone 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"	SC-6 collected at 126.85-127.95' R16: 3 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 8 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 on 5/18/07 START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitley

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
135 -95.2	R17-NQ 5 ft 92%	22	NR	6	131.1, 131.4, 131.5, 131.85, 132.3, 132.4, 132.55, 132.6, 132.75, 132.85, 133.25, 133.55, 133.75, 133.9, 134.0, 134.3, 134.35, 134.45, 134.5, 134.7, 134.85, 134.9, 140.15, 140.45' - Bedding plane (24), 40 deg, undulating, smooth to rough, tight, open <1/2"		Limestone 131.0-135.6' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" over <20% of surface, poorly to moderately fossiliferous with fossil molds, <1" diameter, few cavities with secondary infill <2" diameter, trace laminated bedding	R17: 4 minutes
			6	5				
			7	2				
			NR					
			NR					
			NR					
140 -100.2	R18-NQ 5 ft 95%	60	4	2	136.1, 136.4, 136.6, 137.0, 137.05, 138.5, 139.65, 139.75, 139.8, 139.85, 139.95, 140.2' - Bedding plane (12), <10 deg, rough, undulating, tight, open <1/4"		No Recovery 135.6-136.0' Limestone 136.0-140.75' - 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), 140.0-140.75' medium strong to strong rock (R3 to R4), voids <1/16" over <10% of surface, poorly to moderately fossiliferous, laminated bedding 136.1-136.6', trace secondary infill, 140.2-140.75' cavities over 30% of surface (50% of which have secondary recrystallized infill) <1-1/2" diameter	R18: 5 minutes
			2	2	137.7, 138.25' - Fracture (2), 30 deg, rough, undulating, tight, open <1/4"			
			5	1				
			NR					
			NR					
			NR					
145 -105.2	R19-NQ 5 ft 95%	70	0	2	142.65, 142.95, 143.3, 143.5, 143.9, 145.45' - Fractures (6), <10 deg, rough, undulating, open <1/4" to 1/2"		No Recovery 140.75-141.0' Limestone 141.0-145.75' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), very weak rock (R1) 145.55-145.75', voids <1/16" over <20-40% of surface, many cavities <1" diameter, highly fossiliferous, trace laminated bedding, <30% cavities with secondary recrystallized infill	R19: 6 minutes
			2	3	144.15-144.25' - Fracture zone, rough, undulating, gravel-sized fragments <1/2" diameter			
			10	2	145.55' - Fracture, <10 deg, rough, undulating, open <1"			
			NR		146.1, 146.2, 147.35, 149.25' - Bedding plane (4), <10 deg, rough, undulating, tight, open <1"			
			NR					
			NR					
150 -110.2	R20-NQ 5 ft 88%	80	2	1			No Recovery 145.75-146.0' Limestone 146.0-150.4' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, weak (R2), moderately fossiliferous with molds <1/2" diameter, sandy silt (ML) lenses 146.0-146.1' and 1/2" at 150.25'	SC-7 collected at 147.35-148.55'
			1	0				
			1	>10				
			NR					
			NR					
			NR					
151.0						No Recovery 150.4-151.0'	R20: 5 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 9 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 on 5/18/07 START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
155 -115.2	R21-NQ 5 ft 86%	48	1	150.25-150.35' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter		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 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" 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 HCl reaction Limestone 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 HCl reaction, hardness strengthens with depth, trace medium strong lenses <1/2" thick No Recovery 165.9-166.0'	R21: 7 minutes	
			1	151.3, 152.4, 153.2, 153.3, 153.35, 153.5, 153.85' - Bedding plane (7), <10 deg, undulating, rough to smooth, tight, open to <1/4"				
			5	154.0-155.3' - Bedding plane, rough, undulating, intersecting vertical fractures, tight, open <1/2"				
			>10					
			NR					
160 -120.2	R22-NQ 5 ft 100%	70	1	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"		R22: 5 minutes		
			2					
			9					
			5					
165 -125.2	R23-NQ 5 ft 98%	0	>10	160.6' - Fractures (2), 20 deg and 50 deg, rough, undulating, intersecting, open <1/4"		SC-8 collected at 163.15-164.05'		
			>10	161.0-164.7' - Bedding plane, <10 to 90 deg, undulating, intersecting vertical fractures, rough to smooth				
			>10					
			>10					
170 -130.2	R24-NQ 5 ft 89%	53	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"		R23: 5 minutes		
			NR	166.0-166.2' - Fracture zone, undulating, vertical, smooth to rough, tight				
			>10	166.6, 166.65, 167.3, 167.35, 167.5, 168.15, 169.05, 169.2, 170.05, 170.15, 170.5, 170.35, 170.4' - Bedding plane (13), undulating, <1/4" silt and/or clay sized infilling, rough to smooth, tight, open <1/2"				
			1	167.05-167.15, 167.5-167.6' - Fracture zone (2), rough, undulating, gravel-sized fragments <1", no stain or infill				
			>10	169.4-169.7' - silt lens to extremely friable		R24: 10 minutes		
			5					
			NR					



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
175 -135.2	R25-NQ 5 ft 86%	47	0	171.2-171.3' - silt lens	[Symbolic Log]	Limestone 166.0-170.45' - dark yellowish brown to pale yellowish brown, (10YR 4/2 to 10YR 6/2), very fine to fine grained, grains becoming more coarse with depth 166.0-169.4' very fine to fine-grained, becoming more coarse with depth, weak to strong rock (R2 to R4) interbedded, <1/2" thick silt/sand (carbonate) at 166.65', <10% voids, few cavities/recrystallized cavities <1" diameter, gradational contact to extremely weak rock (R0) at 169.3-169.4' laminated, 169.3-169.7' extremely weak rock (R0) to poorly competent silts/sand (carbonate), laminated, friable, 169.7-170.45' very fine to fine-grained, medium strong to strong rock (R3 to R4), trace voids, no cavities, trace fossils, moderate HCl reaction No Recovery 170.45-171.0' Limestone 171.0-175.3' - pale yellowish brown, (10YR 6/2), very fine to fine grained, 171.0-173.6' weak to strong rock (R2 to R4), 1" silt (ML) lens at 171.2-171.3' - voids <1/16" over <20% of surface, variable, poorly fossiliferous, moderate odor, laminated organics in silt lens, moderate HCl reaction, 173.6-174.1' - interbedded silt (ML) lenses, extremely weak rock (R0), strong odor, strong HCl reaction, 174.1-175.35' - medium strong to strong rock (R3 to R4), <10% voids <1/16", few cavities with secondary recrystallized infill <1" diameter, moderate odor, moderate to strong HCl reaction No Recovery 175.3-176.0' Limestone 176.0-180.2' - light olive gray, (5Y 5/2), very fine to fine grained, medium strong to strong except soil seams (R4 to R5), voids <1/16" over 0-15% of surface, variable, poorly fossiliferous, few cavities <1/2" diameter, moderate to strong HCl reaction, moderate odor, 176.7-176.8', 177.6-177.9' - sandy silt (ML), extremely weak rock (R0) interbedded, laminated with organics, strong odor, moderate HCl reaction No Recovery 180.2-181.0'	R25: 11 minutes
			4	172.1, 172.35, 172.6, 173.15, 173.35, 173.4, 173.6, 174.1' - Bedding plane (8), <10 deg, rough, undulating, tight, open <1/2"			
			10	172.75, 174.5' - Fractures (2), 50 deg and 40 deg, rough, undulating, tight, open <1/4"			
			10	173.6-173.65, 173.8-173.85, 174.0-174.1' - silt/sand silt (ML) lenses			
			0	NR			
180 -140.2	R26-NQ 5 ft 84%	16	10	176.2, 176.25, 176.4, 176.9, 176.98, 177.1, 177.3, 178.55, 178.9, 179.25, 179.4, 179.5, 179.6, 179.8' - Bedding plane, <10 deg, rough, undulating, tight, open <1/2"	[Symbolic Log]	176.7-176.8', 177.6-177.9' - silt seams 178.25-178.35, 179.6-179.7' - Fracture zone (2), rough, undulating, gravel-sized fragments <1" diameter 179.35' - Fractures (2+), vertical, smooth, undulating, vertical, tight 179.95' - Fractures (2+), <10 deg and 40 deg, rough, undulating, intersecting, open <1/2"	R26:9 minutes
			10	178.25-178.35, 179.6-179.7' - Fracture zone <1" diameter			
			>10	179.35' - Fractures (2+), vertical, smooth, undulating, vertical, tight			
			0	179.95' - Fractures (2+), <10 deg and 40 deg, rough, undulating, intersecting, open <1/2"			
			NR	NR			
185 -145.2	R27-NQ 5 ft 84%	16	2	181.8, 181.95, 182.1, 182.25, 182.5, 182.8, 182.9, 183.1, 183.25, 183.4, 183.8, 184.0, 184.3, 184.4, 184.45' - Bedding plane (15), <10 deg, rough, undulating, tight, <1/2"	[Symbolic Log]	182.05, 182.2, 182.4, 182.7, 182.85' - Fractures (5), rough, undulating, open <1/2" 184.1-185.0' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter 185.05' - Fractures, 40 deg, rough, undulating, open <1/4"	SC-9 collected at 181.0-181.8'
			>10	182.05, 182.2, 182.4, 182.7, 182.85' - Fractures (5), rough, undulating, open <1/2"			
			>10	184.1-185.0' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter			
			1	185.05' - Fractures, 40 deg, rough, undulating, open <1/4"			
			NR	NR			



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-02	SHEET 11 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 on 5/18/07 START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitely

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					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 HCl reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on 5/21/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-03	SHEET 1 OF 10
SOIL BORING 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
 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 bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.0	0.0	1.0	SS-1	1-2-3 (5)	Topsoil 0.0-0.1' Silty Sand (SM) 0.1-1.0' - dusky yellowish brown to dark yellowish brown, (10YR 2/2, 10YR 4/2), moist, loose, fine grained, 15-20% non plastic fines, silica sand		Begin E-03 at 11:27 05/07/2007; HW surface casing used in boring
	1.5						
5 37.0	5.0	0.5	SS-2	1-2-2 (4)	Clayey Sand (SC) 5.0-5.5' - greenish gray, (5G 6/1), moist, very loose, 21% fines, 1/2" limestone fragments between 5.3' and 5.6' with mild HCl reaction, no HCl reaction in clay		
	6.5						
10 32.0	10.0	1.0	SS-3	5-18-30 (48)	Silt With Sand (ML) 10.0-10.95' - pale yellowish orange, (10YR 8/6), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 20% very fine to medium sand, carbonate materials		
	11.5						
15 27.0	15.0	0.1	SS-4	50/3 (50/3")	Limestone Fragments 15.0-15.1' - grayish orange, (10YR 7/4), mild to moderate HCl reaction, fragments to 1/2"		
	15.3						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-03	SHEET 2 OF 10
SOIL BORING 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
 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 bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)						
	6"-6"-6" (N)						
22.0	20.0	0.0	SS-5	50/3 (50/3")	No Recovery 20.0-20.3'		
25.0	25.0						
17.0	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		
30.0	30.0						
12.0	30.5	0.3	SS-7	50/5.5 (50/5.5")	Sandy Silt (ML) 30.0-30.25' - Same as 25.0-25.4'		
35.0	35.0						
7.0	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		
40.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-03	SHEET 3 OF 10
SOIL BORING 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
 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 bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
2.0	40.4	0.4	SS-9	50/5 (50/5")	Sandy Silt (ML) 40.0-40.4' - moderate olive brown, (5Y 4/4), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 49% fine to coarse grained sand, carbonate material		
45 -3.0	45.0	0.6	SS-10	42-50/3 (92/9")	Sandy Silt (ML) 45.0-45.6' - Same as 40.0-40.4' except 5-10% fine gravel-sized limestone fragments		
50 -8.0	50.0 50.3	0.0	SS-11	50/3 (50/3")	No Recovery 50.0-50.3'		Driller's Remark: Drill chatter
55 -13.0	55.0 55.3	0.0	SS-13	50/2 (50/2")	Limestone Fragments 55.0-55.05' - moderate olive brown, (5Y 4/4), mild HCl reaction, fragments to 1/4"		
60	60.0 60.1	0.1	SS-12	50/3 (50/3")	No Recovery 60.0-60.1' one 1/2" limestone fragment		Water level at 2.9' below ground surface at 17:31
					Begin Rock Coring at 60.0 ft bgs See the next 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 on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-18.0	60.0 R1-NQ 1 ft 100%	100	1	60.45' - Bedding plane, 15 deg, rough, undulating		Limestone 60.0-60.7' - light olive gray, mottled moderate olive brown, (5Y 5/2, mottled 5Y 4/4), very fine to fine grained, weak to medium strong (R2 to R3), poorly fossiliferous, voids <1/16", 15-25% coverage 60.7-61.0' - Same as 60.0-60.7' except highly fossiliferous with casts and molds up to 1/2" 61.0-65.3' - light olive gray and moderate olive brown, (5Y 5/2, 5Y 4/4), fine to medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" with 10% coverage on surface, extremely weak (R0) rock at 61.2' and 63.95', medium strong (R3) at 61.8' No Recovery 65.3-66.0 Limestone 66.0-67.8' - light olive gray, (5Y 5/2), very fine to fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids <1/16" with 15% coverage of surface 67.8-69.2' - grayish yellow to dusky yellow, (5Y 8/4, 5Y 6/4), medium grained, mild HCl reaction, medium strong (R3), porous voids <1/16" with 45 to 55% coverage, trace 1/4" cavities, moderately fossiliferous (casts/molds) 69.2-70.2' - Same as 66.0-67.8' except extremely weak to medium strong (R0 to R3) No Recovery 70.2-71.0' Limestone 70.2-71.8' - Same as 66.0-67.8' except trace organics 71.8-72.15' - dusky yellow, (5Y 8/4), fine to medium grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), poorly to moderately competent, trace voids <1/16" on surface 72.15-74.15' - Same as 66.0-67.8' 74.15-75.0' - Same as 67.8-69.2' No Recovery 75.0-76.0' Limestone 76.0-80.0' - dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), mild to moderate HCl reaction, medium strong (R3), voids <1/16" covering 45-55% of surface, trace cavities to 1/4", moderately fossiliferous (casts and molds), trace organics	Begin rock coring at 07:47 05/08/2007; water level at 3.9' below ground surface R1: 2 minutes	
65	R2-NQ 5 ft 86%	25	1	61.2, 63.95' - Mechanical break			R2: 3 minutes	
-23.0			2	61.7, 62.2' - Fracture, 75 deg, rough, undulating				
			3	62.8' - Bedding plane, <5 deg, rough, undulating				
			3	63.0' - Bedding plane, 35 deg, rough, undulating, open up to 1/4"				
	R3-NQ 5 ft 84%	34	0	63.15' - Bedding plane, <5 deg, smooth, planar				
			NR	63.25' - Bedding plane, <5 deg, rough, undulating				
			1	64.25' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
			>10	64.65' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
	R4-NQ 5 ft 80%	7	>10	64.8' - Fracture, 80 deg, rough, undulating, open			SC-1 collected at 66.0-66.9'	
			>10	66.9' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
			3	67.3-67.5' - Fracture zone, up to 1-1/2" fragments, intersecting fractures				
			1	67.95' - Bedding plane, 30 deg, rough, undulating, open up to 1/2"				
70	R5-NQ 5 ft 80%	53	NR	68.5' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/4"		R3: 5 minutes		
-28.0			3	68.6' - Bedding plane, <5 deg, smooth to rough, undulating				
			5	68.85-69.15' - Fracture zone, fragments to 2", intersecting fractures				
			>10	69.35, 69.7, 69.95' - Fracture, vertical, rough, undulating				
	R5-NQ 5 ft 80%	53	>10	70.1' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/4"				
			>10	71.1' - Fracture, 60 deg, rough, stepped to undulating, open up to 1/8"				
			NR	71.3, 71.6' - Bedding plane, 25 deg, rough, undulating, open to 1/8", 1/2" at 71.6'				
			NR	72.1, 72.35, 72.7' - Bedding plane, <5 deg, rough to smooth, planar, along abrupt lithology change, open up to 1/8" at 72.1', no gap at 72.7				
75	R5-NQ 5 ft 80%	53	NR	72.15-72.4' - Fracture zone, 70-80 deg, multiple hairline fractures, branch-like appearance		R4: 10 minutes		
-33.0			2	72.8' - Bedding plane, 60 deg, rough to smooth, undulating				
			1	73.1-73.3' - Fracture zone, fragments to 2", intersecting fractures				
			1	73.5' - Bedding plane, 60 deg, rough to smooth, undulating				
	R5-NQ 5 ft 80%	53	5	73.7-74.2, 74.35, 74.6' - Fracture zone, fragments to 2", intersecting fractures, open up to 1/4" at 74.35' and 74.6'				
80			5					



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-03	SHEET 5 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 on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	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.
-38.0			NR		74.8-74.9' - Bedding plane, 60 deg, rough to smooth, undulating, intersects high angle fracture, fragments to 2", predominantly 1/4"	No Recovery 80.0-81.0' Limestone 81.0-85.7' - Same as 76.0-80.0' except yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), trace cavities to 1"	R5: 3 minutes	
81.0			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'			
	R6-NQ 5 ft 94%	63	>10		77.1' - Bedding plane, 30 deg, open up to 1/2"			
			1		78.6' - Bedding plane, 20 deg, tight			
			>10		79.1, 79.3' - Bedding plane, 20 deg, open up to 1/2" at 79.1'			
			>10		79.6, 79.7' - Bedding plane, 20 deg, open up to 1/2"			
			0		79.9' - Fracture, 85 deg, rough, undulating			
85			NR		81.2' - Bedding plane or mechanical break, 40 deg, rough, undulating	No Recovery 85.7-86.0' Limestone 86.0-88.1' - very light gray, (N8), very fine to fine grained, mild HCl reaction, medium strong (R3), voids <1/16" with <2% coverage on surface	SC-2 collected at 84.7-85.7' R6: 3 minutes	
-43.0			>10		81.9' - Bedding plane or mechanical break, <5 deg, rough to smooth, undulating to planar			
	R7-NQ 5 ft 98%	58	>10		82.8' - Fracture, 75 deg, rough, undulating			
			1		83.8-84.1' - Fracture zone, fragments to 1"			
			1		84.75' - Fracture, 75 deg, rough, undulating, open up to 1/4"			
			1		86.4' - Bedding plane, <5 deg, smooth to rough, planar, open to <1/8" gap, organic stain			
			1		86.6, 87.5, 88.5, 88.6' - Mechanical break			
			1		86.9-87.2' - Fracture zone, fragments to 3 1/2"			
			1		88.4' - Fracture, 80 deg, rough, undulating, open 1/8"			
90			NR		89.1' - Bedding plane, 30 deg, rough, undulating	No Recovery 90.9-91.0' Limestone 91.0-96.0' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), laminated bedding 91.0-92.5', trace voids <1/6" and cavities to 1/4", trace fossil casts	R7: 6 minutes	
-48.0			1		90.2' - Bedding plane, 40 deg, rough, undulating			
	R8-NQ 5 ft 100%	80	>10		91.7' - Fracture, 75 deg, associated with dissolution features or very extensive breaks in softer area, open up to 2"			
			3		93.1-93.35' - Fracture zone, intersecting fractures, fragments to 2"			
			1		94.0' - Fractures (2), 65 deg, rough, undulating, open up to 1/2", organic features on fracture surface			
			1		94.6, 95.7' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/2", organic features on fracture surface; no organics at 95.7'		R8: 10 minutes	
95			3		96.2' - Fracture, 80 deg, rough, undulating, open	96.0-100.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), mottled from 96.6-97.5', trace voids from <1/16" to 1/8", organic layers from 97.6-97.7' (black), trace fossil casts		
-53.0			1		96.7' - Bedding plane (2), 10 deg and 60 deg, rough to smooth, undulating			
	R9-NQ 5 ft 92%	57	1		97.5' - Bedding plane, <5 deg, rough to smooth, undulating			
			0		97.6-97.7' - Fracture (3), 0-10 deg, open to 1/4", 1/4" organic infill			
			0		98.5' - Bedding plane (2), 10 deg and 60 deg, rough to smooth, undulating		SC-3 collected at 99.1-99.85'	
100					99.3, 97.6, 99.85' - Mechanical break			



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.9 ft bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-58.0			0				R9: 7 minutes
101.0			NR			No Recovery 100.6-101.0' Limestone 101.0-104.4' - yellowish gray to dusky yellow, (5Y 7/2, 5Y 6/4), fine to medium grained, strong HCl reaction, very weak (R1), 1/16" voids with 10% coverage, trace cavities to 1/4", trace planar bedding of variable thickness, poorly to moderately fossiliferous, zone of circular discoloration from 103.8-104.2' (possible leaching) No Recovery 104.4-106.0'	
	R10-NQ 5 ft 68%	19	8	101.1' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"			
			4	101.3, 101.35, 101.4, 101.5' - Bedding plane, 5-10 deg, rough, undulating, open up to 1/8"			
			4	101.6' - Bedding plane, 35 deg, rough, undulating			
			4	101.8' - Fracture, 65 deg, rough, undulating			
			0	101.9' - Bedding plane, 10 deg, rough, undulating, open up to 1/4"			
105			NR	102.2' - Fracture (2), 60 deg and <5 deg, rough, undulating, open up to 1/8"			R10: 4 minutes
-63.0			NR	102.9' - Fracture (2), 60 deg and 80 deg, rough, undulating, open up to 1/8"			
			1	103.1' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"			
			1	103.25, 103.5' - Bedding plane, 35 deg, rough, undulating			
	R11-NQ 5 ft 78%	43	>10	103.7' - Fracture, 80 deg and vertical, rough, undulating, open up to 1/8"		Limestone 106.0-109.9' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, very weak (R1), trace voids <1/16" on surface, laminated bedding	
			>10	103.9' - Bedding plane, <5 deg, rough, stepped			
110			NR	106.6' - Bedding plane, 30 deg, rough, undulating		No Recovery 109.9-111.0	R11: 3 minutes
-68.0			NR	107.8' - Bedding plane, 25 deg, rough, undulating			
			1	108.2-109.8' - Fracture zone, intersecting fractures, fragments to 2"			
	R12-NQ 5 ft 100%	88	1	111.3' - Bedding plane, 30 deg, rough, undulating, open to 1/2"		Limestone 111.0-116.0' - mottled yellowish gray and yellowish gray, (5Y 7/2 and 5Y 8/1), fine to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" with 10-20% coverage, cavities to 1/4" with 5-10% coverage decreasing with depth, 1" laminated bedding at 114.0', moderately fossiliferous	
			0	112.7, 113.5' - Mechanical break			
			1	113.9, 114' - Bedding plane, <5 deg, rough to smooth, undulating, open up to 1/4"			
115			0				R12: 2 minutes
-73.0			4	116.1, 116.25' - Bedding plane, <5 deg, rough to smooth, undulating to planar, open to <1/8"		Limestone 116.0-121.0' - yellowish gray, (5Y 8/1), fine to coarse grained, strong HCl reaction, weak to medium strong (R2 to R3), laminated bedding at 116.0-116.35', voids <1/16" with 40% coverage, trace cavities to 1/2"-1-1/2" cavity at 117.6', moderately fossiliferous (casts and molds)	
			0	116.45' - Bedding plane, 35 deg, rough, undulating			
	R13-NQ 5 ft 100%	60	1	116.7' - Bedding plane, <5 deg, rough, undulating to planar, open up to 1/4"			
			3	117.1, 118.4, 118.8, 119.7, 120.9' - Mechanical break			
120			3	118.2' - Bedding plane, 10-15 deg, rough, undulating to planar, open up to <1/4"			



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
 WATER LEVELS : 2.9 ft bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-78.0			1	119.0-119.1' - Bedding plane, <5 deg, rough to smooth, undulating to planar, open to <1/8"		Limestone 121.0-125.95' - Same as 116.0-121.0' except transitions from coarse to fine grained with depth, percentage of voids and fossils decrease with depth, laminated bedding from 122.6-125.1' No Recovery 125.95-126.0' Limestone 126.0-130.85' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" with 10% coverage, trace voids to 1/4" and voids <1/16" with 30% coverage from 127.2-128.6' and 130.0-130.85' zone of slightly undular laminated bedding from 128.7-129.2' No Recovery 130.85-131.0' Limestone 131.0-132.8' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), undular bedding planes (variable thickness 1/2" to 1-1/2"), trace voids to 1/16" 132.8-134.9' - yellowish gray and light olive gray, (5Y 8/1 and 5Y 5/2), fine to medium grained, very weak to weak (R1 to R2), up to 1/16" voids cover 5-10%, wavy laminated bedding transitioning to planar with depth, trace fossils (casts) No Recovery 134.9-136.0' Limestone 136.0-139.6' - yellowish gray, (5Y 7/2, 5Y 8/1), very fine to fine grained, strong HCl reaction, trace fossil casts/molds, elongated voids to 1/2" with 5-10% coverage from 136.0-137.5', voids <1/16" with 10% coverage No Recovery 139.6-141.0'	SC-4 collected at 119.7-120.55' R13: 2 minutes	
121.0			3	119.05' - Fracture, 85 deg, fracture between two bedding fractures, open up to 1/8"				
			2	120.55' - Bedding plane, <5 deg, rough to smooth, undulating to planar, open to <1/8"				
			1	121.3' - Fracture, 85 deg, rough, undulating, open to <1/8"				
	R14-NQ 5 ft 99%	40	>10	121.85, 121.9, 122.0' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/4"				
125			>10	122.2' - Bedding plane, <5 deg, smooth to rough, undulating, open to <1/8"				
-83.0			NR	122.4' - Fractures or mechanical break (2), 75 deg and <5 deg, rough, undulating, high angle fracture intersected by bedding (partial fracture), open up to 1/8"				R14: 2 minutes
			0	123.9, 124.5' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/4"				
			1	124.6' - Fracture, 50 deg, rough, undulating, open to <1/4"				
	R15-NQ 5 ft 97%	63	2	124.65' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/4"				
			4	124.9-125.8' - Fracture zone, intersecting fractures, fragments to 1-1/2"				
130			1	127.3' - Bedding plane, 30 deg, rough, undulating, open up to 1/2"				
-88.0			NR	128.4, 128.65' - Mechanical break				
			>10	128.85, 128.9, 129.1, 129.3' - Bedding plane, <5 deg, rough to smooth, undulating, open up to 1/4"; may have associated dissolution cavities at 128.9', 129.1', and 129.3'			R15: 3 minutes	
			>10	129.5, 129.55' - Bedding plane, <5 deg, smooth, planar to undulating, open to <1/8"				
			3	130.25' - Bedding plane, 20 deg, rough to smooth, undulating, open to <1/8"				
	R16-NQ 5 ft 78%	0	>10	131.1' - Bedding plane, <5 deg, rough to smooth, organic stain, open up to 1/4"				
			NR	131.2-131.4' - Fracture zone, intersecting fractures, fragments to 1-1/2"				
			>10	131.7' - Fracture, 70 deg, rough, undulating, open, piece of fracture missing, organic staining				
135			NR	132.0-132.7' - Fracture zone or bedding plane, <5 deg, rough, undulating, open up to 1/8"			R16: 2 minutes	
-93.0			>10	132.7-132.85' - Fracture zone, fragments to 1/2"				
			3	133.4, 133.9, 133.95, 134.0, 134.2, 134.6, 134.65' - Fracture zone or bedding plane, <5 deg, rough, undulating, open up to 1/8"				
			>10	134.5-134.6' - Fracture zone, fragments to 1/2"				
	R17-NQ 5 ft 72%	13	2	136.0-136.4' - Fracture zone, intersecting fractures, fragments to 1-1/2"				
			>10	136.5, 136.8, 136.9, 137.1' - Bedding plane, <5 deg, rough, undulating, open up to 1/2", associated with dissolution				
140				137.4' - Fracture, 65 deg, rough, undulating, open up to 1"; fossils and voids				



PROJECT NUMBER: 338884.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

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

WATER LEVELS : 2.9 ft bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-98.0			NR	137.8' - Bedding plane, <5 deg, rough, undulating, open up to 3/4"		Limestone 141.0-143.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl reaction, very weak (R1), voids <1/16" with 30% coverage, wavy bedding planes to 1/2" 143.5-144.7' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids <1/16" with 10-20% coverage, 1/4" zone at 143.75' of weak to medium strong rock (R2 to R3) with voids <1/16" covering 30-40% of the surface and slightly darker color No Recovery 144.7-146.0' Limestone 146.0-147.0' - grayish yellow to yellowish gray, (5Y 8/4 to 5Y 7/2), very fine to fine grained, strong HCl reaction, strong to weak (R4 to R2), trace organics and voids <1/16" 147.0-147.9' - yellowish gray, light olive gray, and grayish yellow, (5Y 7/2, 5Y 5/2 and 5Y 8/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" with 10% coverage, trace organics, wavy laminated bedding, possible cross bedding 147.9-150.9' - grayish yellow, (5Y 8/1), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" with 10% coverage, trace cavities to 1/4" No Recovery 150.9-151.0' Limestone 151.0-152.15' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), trace voids <1/16", poorly fossiliferous 152.15-155.85' - Same as 151.0-152.15' except yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), weak (R2) No Recovery 155.85-156.0 Limestone 156.0-160.4' - yellowish gray to mottled yellowish gray, and dusky yellow, (5Y 7/2 to mottled 5Y 6/4 and 5Y 6/2), fine to medium grained, strong HCl reaction, medium strong (R3), trace voids, trace fossils (casts)	R17: 5 minutes	
141.0			>10	138.1-138.5' - Fracture zone, fragments to 1-1/2"				
			>10	138.8, 139.1' - Bedding plane, <5 deg, rough, undulating, open up to 1/2", associated with dissolution				
	R18-NQ 5 ft 74%	15	2	139.5' - Fracture, 60 deg, rough to smooth, undulating, open to <1/8"				
			1	141.2-141.7' - Fracture zone or bedding plane, <10 deg, rough, undulating, open to <1/2" (most <1/8")				
145			NR	141.75-142.2' - Fracture zone, intersecting fractures, fragments to 1/2"				
-103.0			NR	142.25, 142.3' - Bedding plane, <5 deg, rough, planar				R18: 3 minutes
			1	142.4-143.0' - Fracture zone, fragments to 1-1/2"				
			1	143.1, 143.3' - Bedding plane, open to 1/4"				
			1	143.5' - Mechanical break				
	R19-NQ 5 ft 98%	58	3	144.1' - Fracture, 75-80 deg, rough, undulating, organic stain or mineralization, open				
			0	144.3' - Mechanical break				
150			2	146.85' - Fracture, 70 deg, rough, undulating				
-108.0			NR	147.75' - Bedding plane, <5 deg, rough, undulating			SC-5 collected at 148.95-150.80'	
			>10	148.0, 148.6, 148.65, 150.8, 150.9' - Bedding plane, <5 deg, rough, undulating, 1/4" open			R19: 4 minutes	
			2	148.1, 148.5, 149.95' - Mechanical break				
			NR	151.0-151.35' - Fracture zone, intersecting fractures, fragments to 1-1/4", some organic staining				
			>10	151.6' - Bedding plane, 15-40 deg, open up to 1"				
			2	152.15, 152.45' - Bedding plane, <5 deg, rough, undulating, open to <1/8"				
	R20-NQ 5 ft 97%	37	3	153.15' - Fracture, 40-45 deg, rough, undulating, open <1/8" to 1/2"				
			3	153.3, 153.9, 154.9' - Bedding plane, <5 deg, rough, planar, open to 1/4" at 154.9'				
155			1	154.6' - Fracture (2), 65 deg and <5 deg, intersected with bedding fracture, open up to 1/8"			R20: 2 minutes	
-113.0			NR	155.8' - Bedding plane, <5 deg, rough, undulating, open to <1/8"				
			2	156.15' - Bedding plane, <5 deg, smooth to rough, planar to undulating, trace organics, open to <1/4"				
			>10	156.7' - Bedding plane, 10 deg, rough, undulating, open up to 1"				
			>10	157.1' - Bedding plane, <5-35 deg, rough, undulating, open up to 1"				
	R21-NQ 5 ft 88%	23	4	157.2' - Bedding plane, 35 deg, rough, undulating, open up to 1/8"				
160								



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.9 ft bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-118.0			>10	157.35' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"		No Recovery 160.4-161.0' Limestone 161.0-162.6' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, medium strong (R3), <1/16" voids with 5-10% coverage, trace cavities to 1/4", poorly fossiliferous 162.6-165.25' - alternating dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium to very fine grained, strong to moderate HCl reaction, 15-20% coverage of voids <1/16" and fossiliferous in dusky yellow zones; trace voids <1/16" and no visible fossils in light olive gray zones No Recovery 165.25-166.0' Limestone 166.0-170.6' - light olive gray and dusky yellow, (5Y 5/2 and 5Y 6/4), fine to medium grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids to 1/16" with 30-40% coverage and cavities up to 1/4"x1/2", color transitions to moderate yellowish brown (10YR 5/4) at 169.7' with interbeds of light olive gray material up to 2" No Recovery 170.6-171.0' Limestone 171.0-174.3' - Same as 166.0-170.6' except light olive gray to dusky yellow, (5Y 5/2 to 5Y 6/4) No Recovery 174.3-176.0' Limestone 176.0-177.3' - yellowish gray, (5Y 8/1), very fine to medium grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), moderately fossiliferous (casts, trace molds), voids <1/16" with 10% coverage, cavities to 1/4" with 5% coverage	Driller's Remark: 100% loss of circulation at 159.5' R21: 3 minutes	
161.0			NR	157.45-157.7' - Fracture zone, intersecting fractures, fragments to 1"				
	R22-NQ 5 ft 85%	28	4	157.8, 157.9, 158.5' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"				
			3	158.6-158.8' - Fracture zone, intersecting fractures, fragments to 1-1/2"				
			8	158.9, 159.05, 159.15, 159.3' - Bedding plane, <5 deg, rough, undulating, open 1/8-1/4"				
			5	159.6' - Bedding plane, 10-30 deg, rough, undulating, open up to 1/8"				
165			>10	160.05' - Bedding plane, 35 deg, rough, undulating, open up to 1/8"				
-123.0			NR	160.1-160.2' - Fracture zone				R22: 3 minutes
			1	161.05, 161.5, 161.6' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
	R23-NQ 5 ft 92%	29	2	161.75' - Bedding plane, <5 deg, rough, undulating, open up to 1"				
			4	162.6' - Bedding plane, <5 deg, rough, undulating, open to <1/8"				
			>10	162.8, 162.9' - Bedding plane, <5 deg, rough, planar, open up to 1/4"			SC-6 collected at 166.0-166.85'	
			1	163.1' - Fracture, 60 deg, rough, undulating, open to 1/8"				
			4	163.3, 163.4' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
170			1	163.45' - Fracture, 85 deg, rough to smooth, planar to undulating, intersects bedding plane fracture			R23: 3 minutes	
-128.0			NR	163.55, 163.6, 163.65' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
			4	163.9' - Bedding plane, horizontal and 35 deg, open				
	R24-NQ 5 ft 66%	33	>10	164.3, 164.4, 164.6, 164.75, 164.8' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"				
			>10	165.0-165.2' - Fracture zone, fragments to 1", most to 1/4", intersecting fractures				
			1	166.85, 167.4, 167.5' - Bedding plane, <15 deg, rough, undulating, open to 1/8"				
			NR	168.0' - Fracture, 75 deg, rough, undulating, open up to 1/8"				
175			NR	168.25, 168.35, 168.5' - Bedding plane, <15 deg, rough, undulating, open up to 1/8"			R24: 4 minutes	
-133.0			NR	168.7, 168.85' - Bedding plane, <5 deg, rough, undulating, open to 1/8"				
			3	169.1, 169.7, 169.75' - Bedding plane, <5 deg, smooth to rough, planar, open to 1/8"				
			3	169.85, 170.35' - Fracture, 55-60 deg, rough, undulating, open to 1/2"				
	R25-NQ 5 ft 95%	18	3	171.2, 171.45, 171.55, 171.95' - Bedding plane, <5 deg, rough to smooth, planar, open up to 1/4", open to 1/2" at 171.95				
			6	172.8-178.4' - Fracture zone, intersecting fractures, fragments to 1-1/2"				
180			6	173.5, 174.05' - Bedding plane, <5 deg, rough to smooth, planar, open up to 1/4", gray staining at 173.5'				



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 METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.9 ft bgs on 5/07/07 START : 5/7/2007 END : 5/8/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-138.0	181.0 R26-NQ 5 ft 85%		5	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'	177.3-178.3' - yellowish gray to dusky yellow, (5Y 8/4 to 5Y 6/4), fine to medium grained, moderate HCl 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 HCl reaction 182.5-185.25' - alternating yellowish gray, (alternating 5Y 8/1 and 5Y 7/2), very fine to medium grained, strong to moderate HCl reaction, strong to medium strong (R4 to R3), alternating beds, trace voids <1/16" and cavities to 1", voids <1/16" with 20-30% 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	R25: 4 minutes	
			NR	177.5' - Bedding plane, <5 deg, rough, planar to undulating, open to <1/8"			
			4	177.7' - Bedding plane, 35 deg, rough, undulating, open to <1/2"			
			>10	178.15, 178.5' - Mechanical break			
			>10	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"			
			4	179.75' - Bedding plane, <5 deg, rough, planar to undulating, open to 1/8"			
185			1	179.8, 180.2, 180.3' - Bedding plane, <5 deg, rough, planar to undulating, open to <1/8"	R26: 3 minutes		
-143.0			NR	180.1' - Fracture, 60 deg, rough, undulating 180.4' - Fracture, 85-90 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"			
				182.3' - Bedding plane, 15 deg, organic stain, open to <1/8"			
				182.5' - Bedding plane, <10 deg, open to 1/8"			
				182.85-183.0' - Fracture zone, fragments to 1", intersecting fractures			
				183.1' - Bedding plane, 15 deg, organic stain, open to <1/8"			
				183.4-183.5' - 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"			
				183.65, 184.25' - Fracture, 55-60 deg, rough, undulating, open to <1/8"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 1 OF 12
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
				1-2-2 (4)			
43.1	0.0	1.4	SS-1	1-2-2 (4)	Topsoil 0.0-0.3' Poorly Graded Sand With Organics (SP) 0.3-1.4' - medium light gray grading to medium gray and greenish black, (N6 to N5 and 5GY 2/1), moist, very loose, fine grained, 20-25% organic fines, decreasing with depth, sand is silica		No water level - start hole Cathead operator: Paul Buchler
	1.5						
5 38.1	5.0	1.0	SS-2	1-2-2 (4)	Clayey Sand (SC) 5.0-5.35' - light greenish gray, (5GY 8/1), wet, very loose, very fine to fine grained, 35% low to medium plasticity fines, sand is silica Silty Sand (SM) 5.35-6.0' - grayish orange, (10YR 7/4), wet, very loose, very fine to fine grained, 25% nonplastic fines, sand is silica		
	6.5						
10 33.1	10.0	1.2	SS-3	22-40-50/5 (90/11")	Silt With Sand (ML) 10.0-11.2' - dark yellowish orange, (10YR 6/6), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 16% of sand-sized, carbonate material		
	11.4						
15 28.1	15.0	0.7	SS-4	40-50/4 (90/10")	Silt With Sand (ML) 15.0-15.7' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% fine to medium sand-sized, carbonate material		
	15.8						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 2 OF 12
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
23.1	20.0	0.1	SS-5	50/2 (50/2")	Limestone Fragments 20.0-20.1' - grayish orange, (10YR 7/4), mild HCl reaction, coarse sand-sized fragments, very poor recovery		
25	25.0						
18.1		1.0	SS-6	13-20-25 (45)	Silty Sand (SM) 25.0-26.0' - grayish orange, (10YR 7/4), wet, dense, fine to coarse grained, mild HCl reaction, 30% nonplastic fines, 13% gravel-sized limestone fragments with many fossil molds/casts, all carbonate material		
	26.5						
30	30.0						
13.1		1.1	SS-7	5-17-14 (31)	Sandy Silt (ML) 30.0-31.1' - dusky yellow, (5Y 6/4), wet, hard, fine to coarse grained, fine% gravel, nonplastic, rapid dilatancy, mild HCl reaction, 30% fine to coarse sand-sized, 10% fine gravel-sized limestone fragments, carbonate material		
	31.5						
35	35.0						
8.1	35.3	0.3	SS-8	50/4 (50/4")	Limestone Fragments 35.0-35.3' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, coarse sand to fine gravel sized fragments, poor recovery		
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 3 OF 12
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
3.1	40.0	0.1	SS-9	50/4 (50/4")	Limestone Fragments 40.0-41.0' - pale olive, (10Y 6/2), mild HCl reaction, poor recovery		Very hard rock, a lot of bit chatter - if continues will start coring at 45.0'
45 -1.9	45.0 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 to coarse grained, mild HCl reaction, 40% low plastic fines, 15% fine gravel-sized, carbonate material		Continue drilling soils based on drillers log of nearby boring GSC-6 where they went through a tough rock layer, then about 5.0' of sand from about 48.0-53.0', the driller wants to make sure they case deep enough at the start of the hole
50 -6.9	50.0 50.4	0.3	SS-11	50/5 (50/5")	Silty Gravel With Sand (GM) 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 material		
55 -11.9	55.0 56.5	1.4	SS-12	22-35-35 (70)	Silty Sand With Limestone (SM) 55.0-56.4' - moderate olive brown, (5Y 4/4), wet, very dense, fine to coarse grained, mild HCl reaction, 20-25% low plastic fines, 20% fine to coarse gravel-sized, carbonate materials		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 4 OF 12
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
-16.9	60.0	1.3	SS-13	Silty Sand With Gravel (SM) 60.0-61.3' - moderate olive brown, (5Y 4/4), moist, very dense, fine to coarse grained, rapid dilatancy, mild to moderate HCl reaction, 40% nonplastic fines, 17% gravel-sized limestone fragments Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log		
	61.4					
65 -21.9						
70 -26.9						
75 -31.9						
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 5 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
61.5	R1-NQ 4.5 ft 89%	63	3	61.6' - Fracture, rough, undulating 61.95' - Mechanical break 62.3' - Mechanical break	Limestone 61.5-65.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak (R2), 30% void space typically related to fossil casts, trace stringers and lenses of black organic material from 61.5', moderate HCl reaction where pulverized, solution cavities to 1-1/2"x3/8", organic lenses, partings and blebs disseminated through the run No Recovery 65.5-66.0' Limestone 66.0-67.8' - Same as 61.5-65.5' 67.8-68.0' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), limestone is composed of silt sized particles with trace organic pieces 68.0-69.6' - light olive gray, (5Y 5/2), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), 40% open voids that are fossil casts of forams and some possible pelecypods, thin stringers of carbon or organic black material between 68.0' and 68.3' 69.6-70.45' - Same as 67.8-68.0' except laminar bedding 70.45-70.9' - Same as 68.0-69.6' No Recovery 70.9-71.0' Limestone 71.0-72.9' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), except 72.3-72.9' zone medium strong to strong (R3 to R4), voids to 1/16" covering 20% of surface, fossiliferous (casts) 72.9-73.5' - light brown, (5Y 6/4), fine to medium grained, mild HCl reaction, very weak (R1), bedding planes irregular, with varying angles and gently crenelated, the angle increases with depth, small stress fractures between and through the planes, which are laminar to thin bedded 73.5-75.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild to very mild HCl reaction, medium strong (R3), 12-15% voids (fossil casts), trace laminar bedding, trace organics	16:05 Began inserting new bit and reamer to 61.5' Driller's Remark: Reamed the borehole to 61.5' below ground surface 5/2/07 at 16:23, Commence coring First core run is 4.5' long to get even run at 66.0'	
65 -21.9			2	62.5' - Fracture, rough, undulating, along solution cavity 62.85' - Bedding plane, possible separation			
			1	63.9' - Mechanical break			
			3	64.85' - Mechanical break 65.1' - Mechanical break or fracture, along solution cavity			
66.0	R2-NQ 5 ft 98%	90	NR	65.25' - Mechanical break or fracture, along solution cavity 66.5' - Mechanical break		R1: 2 minutes	
70 -26.9			1	67.25' - Mechanical break			
			0	67.95' - Fracture, smooth, planar, at contact with finer grained segment			
			1	69.55' - Fracture, 65 deg, rough, irregular 70.0' - Mechanical break			
75 -31.9			1	70.6' - Mechanical break or fracture, very rough, irregular			
			NR	70.6' - Mechanical break or fracture, very rough, irregular			
	2	71.5' - Fracture, smooth, undulating, some fines buildup from drilling 71.95' - Mechanical break					
80 -36.9	R3-NQ 5 ft 98%	78	1	73.0' - Fracture, smooth, undulating, soft thin gouge zone and gently undulant surface near contact 73.5' - Fracture, appears shattered, angular faces	R2: 4 minutes		
			2	74.3' - Mechanical break			
			4	74.95' - Fracture, appears shattered at lithology change, angular			
			NR	75.3' - Fracture, 30 deg, smooth, planar 75.6' - Fracture, 3-5 deg, smooth			
81.0	R4-NQ 5 ft 73%	50	1	75.75' - Mechanical break 75.85' - Mechanical break	R3: 4 minutes		
			4	76.65' - Mechanical break, 60 deg, probably part of cleavage 77.6-78.0' - Fracture zone, cannot describe because the fragments were cleaved by the bit; fragments are angular with sharp edges, may have been broken during drilling			
			>10	79.0' - Fracture, 40 deg, 1" thick where there is a parallel fracture, these have been broken then another fractured piece to 79.4, the remainder of the rock is unbroken			
			NR			R4: 7 minutes Driller's Remark: Lost circulation at 80.0-80.3'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 6 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILL MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
85 -41.9	R5-NQ 5 ft 84%	27	>10 7 5 >5 1 NR	81-81.7' - Fracture zone, rock fragments from 1/4"-1/2", no visible orientation, angular to subangular fragments 81.9' - Fracture, undulating, generally horizontal, irregular 82.2' - Bedding plane, <5 deg, open 82.6-83.0' - Fractures, 0-90 deg, open, fragments vary in shape and size 83.0-83.5' - Fractures, 0-90 deg, open, fragments vary in shape and size 85.7' - Fracture, fracture from 85.7-85.9' does not extend across the core	75.0-75.75' - Same as 72.9-73.5' except trace organics 75.75-77.6' - light brown, (5Y 6/4), fine grained, weak to medium strong (R2 to R3), 15-30% void space (fossil casts), mild HCl reaction unless pulverized 77.6-79.65' - light olive gray with pale olive alteration bands, (5Y 5/2 with 10Y 6/2), very fine to medium grained, moderate to strong HCl reaction, strong (R4) No Recovery 79.65-81.0' Limestone	R5: 4 minutes	
86.0	R6-NQ 5 ft 86%	63	0 1 0 >10 >10 NR	86.5-86.9' - Fracture zone, fragments <1" x 1" average at 1/2" x 1/2" 87.75' - Fracture or bedding plane, 0-20 deg, rough, undulating, 1" open, 88.3' - Mechanical break 88.5' - Mechanical break 89.35' - Fracture, 80 deg, rough, undulating, 1/8" open 89.7-90.15' - Fracture zone, intersecting fractures, up to 1" x 1/2" fragments, some silt with organics from 89.7-89.8'	81.0-82.2' - light bluish gray grading to light olive gray, (5B 7/1 to 5Y 6/1), very fine to fine grained, mild HCl reaction, strong to very strong (R4 to R5), delayed reaction to HCl, voids <1/16" over 20% of surface, trace cavities to 1/8", trace organics, poorly fossiliferous 82.2-83.1' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids to 1/16" 5% coverage, trace organics 83.1-85.2' - dusky yellow transitioning to yellowish gray, (5Y 6/4 to 5Y 8/1), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), voids <1/16" 30-40% coverage No Recovery 85.2-86.0' Limestone 86.0-90.3' - Same as 83.1-85.2' except moderately fossiliferous, with 5-10% coverage of cavities to 1/2" No Recovery 90.3-91.0' Limestone	End of drilling for the day, 5/2/07 at 86' Resume drilling on 5/3/07 Water level 5.5' below ground surface on 5/3/07 R6: 6 minutes Possible start of breccia zone at 89.7-90.5'	
90 -46.9	R7-NQ 5 ft 96%	67	0 >10 3 2 0 NR	91.85' - Mechanical break 92.6-93.05' - Fracture zone, with some clay infill 93.4, 93.75' - Fracture or bedding plane (2), horizontal, rough, undulating, 5% organics on bottom surface of fracture, up to 1/4" open 93.6' - Fracture, 80 deg, rough, undulating, organics on 5% of fracture 94.2' - Mechanical break 94.45' - Fracture, 5 deg, smooth, planar, tight, slight organics on fracture surface (5-10%)	86.0-90.3' - Same as 83.1-85.2' except moderately fossiliferous, with 5-10% coverage of cavities to 1/2" No Recovery 90.3-91.0' Limestone 91.0-93.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 8/1), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" 25-35% of surface, trace cavities to 1/2", trace organics 93.5-95.8' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate HCl reaction, voids <1/16" predominately from 93.8-94.1', 10-20% of surface, <1% cavities to 1/2", trace fossil casts No Recovery 95.8-96.0' Limestone	R7: 5 minutes	
95 -51.9	R8-NQ 5 ft 98%	83	1 3 2 0 0 NR	94.9' - Bedding plane, 5 deg, rough, undulating, organic staining, open 2", clay infill with limestone fragments 95.25' - Mechanical break 96.3' - Mechanical break 96.8' - Fracture, 5 deg, organic staining, bedding plane fracture, open 3", infill fines 97.0, 97.05' - Bedding plane (2), smooth, undulating, organics (5-10%) of surface of fracture, up to 1/8" open 97.8' - Fracture, 80 deg, rough, undulating, organic staining 98.5' - Mechanical break 99.1' - Mechanical break 100.2' - Mechanical break	96.0-90.3' - Same as 83.1-85.2' except moderately fossiliferous, with 5-10% coverage of cavities to 1/2" No Recovery 90.3-91.0' Limestone 91.0-93.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 8/1), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" 25-35% of surface, trace cavities to 1/2", trace organics 93.5-95.8' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate HCl reaction, voids <1/16" predominately from 93.8-94.1', 10-20% of surface, <1% cavities to 1/2", trace fossil casts No Recovery 95.8-96.0' Limestone 96.0-100.9' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), 10-20% voids (<1/16") over surface, trace cavities up to 1/2", moderately fossiliferous (casts/molds)	R8: 9 minutes	
100 -56.9							



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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -61.9	R9-NQ 5 ft 100%	85	3 0 1 0	101.2' - Fracture, 5 deg, rough, undulating, bedding plane fracture, up to 1/8" open 101.7, 101.9' - Mechanical break (2), high angle, tight 103.25, 103.5, 104.45' - Mechanical break (3)	No Recovery 100.9-101.0' Limestone 101.0-106.0' - yellowish gray, (5Y 8/1), very fine to fine grained, strong to very strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" 5-10%, trace cavities to 1/4", moderately fossiliferous (casts/molds), <1% oval to circular, calcite filled voids	SC-1 collected at 103.5-104.45' R9: 4 minutes	
110 -66.9	R10-NQ 5 ft 100%	68	>5 3 1 1 4 3	105.5' - Fractures or mechanical break, multiple fractures intersecting 106.1' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/4" open 106.25' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/2" open 106.5' - Fracture, 10 deg, smooth, undulating, bedding plane fracture, up to 1/4" open 107.4' - Mechanical break 108.85' - Mechanical break or bedding plane, 5 deg, tight 109.15' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/4" open 109.35' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/4" open 109.55' - Fracture, 30 deg, smooth, undulating, bedding plane fracture, except 1" open			106.0-111.0' - Same as 101.0-106.0' except yellowish gray, (5Y 8/1 to 5Y 7/2), trace planar bedding of variable widths, trace cavities to 1"	R10: 3 minutes
115 -71.9	R11-NQ 5 ft 96%	57	>10 >10 0 1	109.8' - Fracture, 5 deg, smooth, undulating, bedding plane fracture, up to 1/4" open 110.05' - Fracture, high angle 110.45' - Mechanical break, 5 deg, tight 110.5' - Mechanical break, 65 deg, rough, undulating, dark (possibly organic) 111.2' - Fracture zone, intersecting fractures up to 1/2" fragments 111.6, 111.95, 112.02, 112.25, 112.25, 112.4, 112.6, 112.7, 112.8' - Fracture (9), 0-5 deg, smooth, undulating, bedding plane fracture, easily separates	111.0-115.8' - white to yellowish gray, (N9 to 5Y 8/1), very strong HCl reaction, extremely weak to weak (R0 to R2), trace organics, <2% voids to 1/16", trace wavy bedding, poorly fossiliferous (casts)	R11: 5 minutes	
120 -76.9	R12-NQ 5 ft 99%	80	NR 1 0 0 2 4 NR	112.85-113.2' - Fracture zone, intersecting fractures up to 1/2" fragments 116.95, 119.75, 119.8, 120.1, 120.8' - Fracture (5), smooth, undulating, bedding plane fracture, easily separates	No Recovery 115.8-116.0' Limestone 116.0-120.95' - Same as 111.0-115.8' except fine to medium grained, 20-30% voids to 1/16", trace cavities to 1/2", moderately fossiliferous	R12: 3 minutes	
					No Recovery 120.95-121.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 8 OF 12
ROCK CORE LOG		

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 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -81.9	R13-NQ 5 ft 94%	65	2	120.9' - Fracture zone, intersecting fractures, fragments up to 1/2"	Limestone 121.0-125.7' - yellowish gray, (5Y 8/1), fine to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), medium to coarse grained zone at 123.2-124.0', trace voids <1/16", cavities to 1/4" <2% of surface, moderately fossiliferous (casts/molds), trace ovalar voids with calcite infill No Recovery 125.7-126.0' Limestone 126.0-129.9' - Same as 121.0-125.7' except fine to medium grained, trace organics No Recovery 129.9-131.0'	R13: 2 minutes	
			2	121.2' - Fracture, 50 deg, smooth, undulating, up to 1/8" open			
			2	121.6' - Fracture or mechanical break, horizontal, bedding plane			
			>5	122.1' - Fracture, 5 deg, rough, undulating, bedding plane, up to 1/4" open			
			4	122.4' - Fracture, 5 deg, rough, undulating, bedding plane, up to 1/4" open			
			NR	123.2' - Fracture, 5 deg, rough, undulating, bedding plane, up to 1/4" open			
				123.5' - Fracture, 60 deg, undeveloped fracture associated with 123.9'			
			>10	123.9' - Fracture, 60 deg, rough, undulating, up to 1/8" open			
			0	124.6-124.7' - Fracture zone, intersecting fractures, fragments up to 1"			
			1	125.6-125.7' - Fracture zone, intersecting fractures, fragments up to 1"			
130 -86.9	R14-NQ 5 ft 98%	70	1	126.4' - Fracture, 75 deg, rough, undulating, medium light gray staining	No Recovery 129.9-131.0' Limestone 131.0-135.75' - yellowish gray, (5Y 7/2), fine to coarse grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 5-10% of surface, trace planar bedding of variable widths, rock is friable at 132.0-133.5', trace fossil casts No Recovery 135.75-136.0' Limestone 136.0-140.7' - Same as 131.0-135.75' except mottled with light olive gray (5Y 5/2), becoming predominantly light olive gray at 138.8-139.1' and 140.1-140.35', trace cavities to 1/4", 5-10% coverage of voids to 1/2" with calcite infill from 139.1-140.1' No Recovery 140.7-141.0'	R14: 4 minutes	
			1	126.5-126.7' - Fracture zone, intersecting fractures, fragments up to 1"			
			3	126.95' - Fractures (3), 70 deg, rough, undulating			
			NR	128.4' - Mechanical break			
			>10	128.6' - Fracture, 70 deg, rough, undulating, medium light gray staining			
			1	129.4' - Fractures (2), rough, undulating, medium light gray staining, intersecting fractures			
			3	130.45' - Fracture, horizontal, rough, undulating, bedding plane fracture			
			NR	130.6' - Fracture, 75 deg, rough, undulating, medium light gray staining, up to 1/4" open			
			13	130.9' - Fracture, horizontal, rough, undulating, bedding plane fracture, up to 1/4" open			
			>10	131.2' - Fracture, horizontal, rough, undulating, bedding plane fracture, up to 1/8" open			
135 -91.9	R15-NQ 5 ft 95%	13	5	131.3-131.5' - Fracture zone, intersecting fractures, up to 1" fragments	No Recovery 135.75-136.0' Limestone 136.0-140.7' - Same as 131.0-135.75' except mottled with light olive gray (5Y 5/2), becoming predominantly light olive gray at 138.8-139.1' and 140.1-140.35', trace cavities to 1/4", 5-10% coverage of voids to 1/2" with calcite infill from 139.1-140.1' No Recovery 140.7-141.0'	R15: 3 minutes	
			NR	131.7-131.85' - Fracture zone, intersecting fractures, up to 1/2" fragments			
			0	132.6' - Fracture, 5 deg, bedding plane fracture, open less than 1/8"			
			1	133.1' - Fracture, 55 deg, rough, undulating, bedding plane fracture, up to 1/4" open			
			2	133.8' - Fracture, 0-5 deg, rough, undulating, bedding plane fracture, up to 1/4" open			
			3	133.9' - Fracture, 55 deg, rough, undulating, up to 1/2" open			
			NR	134.1-134.95' - Fracture zone, intersecting fractures			
			76	135.2, 135.25' - Fracture (2), 5 deg, bedding plane fracture, open less than 1/8"			
			1	135.3' - Fracture, 25 deg, rough, undulating, bedding plane fracture			
			NR	135.55' - Fracture, <5 deg, rough, undulating, bedding plane fracture			
140 -96.9	R16-NQ 5 ft 94%	76	3		No Recovery 140.7-141.0'	R16: 3 minutes	
			1				
			NR				



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
145 -101.9	R17-NQ 5 ft 88%	45	>10 >10 >10 3 1 NR	135.65' - Fracture, <5 deg, rough, undulating, bedding plane fracture 136.9' - Mechanical break 137.75' - Fracture, 5-10 deg, rough, undulating, bedding plane fracture, up to 1/4" open 138.2' - Mechanical break 138.5' - Mechanical break 138.55' - Bedding plane, 5 deg, rough, undulating 138.75, 139.1' - Bedding plane (2), 0-5 deg, rough, planar 140.15, 140.35' - Bedding plane (2), 0-5 deg, rough, planar, up to 1/2" open 140.2' - Bedding plane, 5 deg, rough, undulating	Limestone 141.0-145.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 8/1), very fine to fine grained, mild to moderate HCl reaction, strong (R4), trace organics, voids to <1/16" over 5-10% of surface, trace cavities to 1", highly to moderately fossiliferous decreasing with depth, trace laminar bedding No Recovery 145.4-146.0'	R17: 7 minutes	
150 -106.9	R18-NQ 5 ft 80%	53	>10 2 2 4 NR	141.5' - Fracture, 30 deg, up to 1/4" open 142.2-142.3' - Fracture zone, intersecting fractures, up to 1/2" fragments 142.4' - Fracture, 0-5 deg, bedding plane fracture, olive gray (5Y 3/2) organic staining, up to 1/4" open 142.6' - Fracture, 0-5 deg, organic staining, up to 1/4" open 142.85-142.45' - Fracture zone, intersecting fractures, up to 1/2" fragments 143.95-143.6' - Fracture zone, intersecting fractures, up to 1/2" fragments 143.7' - Fracture, 0-5 deg, organic staining, tight	Limestone 146.0-146.5' - Same as 141.0-145.4' except only trace voids to 1/8" size 146.5-149.4' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), medium to coarse grained, mild HCl reaction, medium strong to strong (R3 to R4), porous, voids <1/16" 20-30% of surface, cavities to 1/4" 10% of surface, moderately fossiliferous (casts/molds) 149.4-150.0' - Same as 146.0-146.5' No Recovery 150.0-151.0'	R18: 3 minutes	
155 -111.9	R19-NQ 5 ft 80%	23	2 >10 5 4 NR	143.9' - Fracture, 0-5 deg, organic staining, up to 1/8" open 144.0' - Fracture, 0-5 deg, organic staining, up to 1/8" open 144.3' - Fracture, 0-5 deg, organic staining, up to 1/4" open 144.5' - Fracture, 15 deg, organic staining, tight 144.8' - Mechanical break 145.0' - Fracture, 15 deg, possible organic stain on 50% of surface, up to 1/4" open 146.0-146.3' - Fracture zone, intersecting fractures, fragments up to 1/2"	Limestone 151.0-155.0' - yellowish gray, (5Y 8/1 to 5Y 7/2), fine to medium grained, mild HCl reaction, medium strong to strong (R3 to R4), 10% black/olive gray organic staining, voids to 1/16" over 5-10% of surface, zone of moderately competent rock with wavy laminar bedding planes at 153.0-153.5' No Recovery 155.0-156.0'	R19: 4 minutes	
160 -116.9	R20-NQ 5 ft 42%	37	3 1 0 NR	146.9, 146.95' - Fracture (2), 0-5 deg, rough, undulating, bedding plane fractures, up to 1/8" open 147.1' - Fracture, 20 deg, rough, undulating, up to 1/4" open 147.95' - Fracture, 5 deg, rough, undulating, up to 1/4" open 148.1, 149.1' - Fracture (2), 5 deg, rough, undulating, up to 1/8" open 148.3' - Fracture, 20 deg, rough, undulating, up to 1/2" open 148.5' - Fracture, 50-60 deg, undeveloped or healed 149.3, 149.4, 149.8' - Fracture (3), 5 deg, rough, undulating, 1/8"-1/4" open 151.6' - Fracture, 70-80 deg, rough, undulating, organic stain on 95% of fracture surface, up to 1/4" open	Limestone 156.0-157.2' - dusky yellow, (5Y 8/1), medium grained, mild HCl reaction, weak (R2), voids to 1/16" 20-30%, cavity to 1/2" 5-10%, moderately fossiliferous (casts/molds) 157.2-158.1' - yellowish gray, (5Y 8/1), fine to medium grained, moderate to strong HCl reaction, voids to <1/16" 5-10% of surface, trace cavities to 1/4", trace organics, trace fossils (casts) No Recovery 158.1-161.0'	SC-2 collected at 156.3-157.23' R20: 6 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 10 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
165 -121.9	R21-NQ 5 ft 72%	16	3 4 >10 4	151.65' - Fracture, 5 deg, rough, undulating, organic staining, bedding plane fracture, intersecting, <1/8" open, olive gray (5 Y 3/2) 152.0-152.2' - Fracture zone, fragments up to 1", intersecting fractures 152.25' - Fracture, <5 deg, rough, undulating, bedding plane fracture, <1/8" open 152.4' - Fracture, <5 deg, rough, undulating, bedding plane fracture, up to <1/4" open 152.45' - Fracture or mechanical break, <5 deg, rough, undulating, bedding plane fracture, up to <1/4" open 152.55' - Fracture, <5 deg, rough, undulating, bedding plane fracture, tight	Limestone 161.0-164.6' - yellowish gray with light olive gray mottling, (5Y 7/2 with 5Y 5/2), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), 5-10% voids to <1/16" decreasing with depth, <1% cavities to 1/4", mildly fossiliferous, trace planar bedding No Recovery 164.6-166.0'	R21: 7 minutes	
166.0		NR	152.9' - Fracture zone, fragments up to 1", intersecting fractures 153' - Fracture zone, fragments up to 1", intersecting fractures 153.05, 153.15, 153.3' - Fracture (3), <5 deg, rough, undulating, bedding plane fracture, <1/8" open 153.4' - Fracture, <5 deg, rough, undulating, bedding plane fracture, up to 1/2" open 153.5' - Mechanical break 153.6' - Fracture, 10 deg, rough, undulating, bedding plane fracture, up to 1/2" open 154.2, 154.3' - Fracture (2), 10 deg, rough, undulating, bedding plane fracture, up to 1/4" open				
170 -126.9	R22-NQ 5 ft 96%	62	5 1 2 3 0	154.45' - Fracture, 85 deg, rough, undulating, remineralization, olive gray (5Y 3/2) organic staining 154.65' - Fracture or bedding plane, 30 deg, smooth to rough, undulating, up to 1" open 156.05' - Fracture, 5-10 deg, up to 1/4" open 156.15, 156.3' - Fracture (2), 5-10 deg, up to 1/2" open 157.25' - Fracture, 5 deg, smooth, undulating, bedding plane fracture along abrupt bedding, up to 1/4" open 157.4' - Fracture, healed or undeveloped, olive gray (5Y 3/2) organic staining 161.3' - Fracture, 10 deg, rough, undulating, bedding plane, up to 2/3" open 161.55' - Fracture, 40 deg, rough, undulating, up to 1/2" open 161.8' - Fracture or bedding plane, up to 1/2" open 162.2, 162.45' - Fracture (2), <5 deg, rough, undulating, bedding planes, up to <1/2" open 162.3' - Fracture, 80-90 deg, partially healed 162.75' - Fracture, 10 deg, rough, undulating, bedding plane 163.15' - Fracture, 10 deg, rough, undulating, bedding plane 163.35-163.5' - Fracture zone, fractures intersecting, up to 1" fragments 163.8' - Fracture, 10 deg, rough, undulating, bedding plane, up to 2/3" open 163.9' - Fracture, 40 deg, rough, undulating, up to 1/2" open	Limestone 166.0-170.8' - yellowish gray and dusky yellow in alternating zones of variable widths (3"-8"), (5Y 7/2 and 5Y 6/4), moderate HCl reaction, medium strong to strong (R3 to R4), medium strong (R3) zone from 166.5-167.2', voids to <1/16" 10-20% decreasing with depth, trace cavities to 1/2", mild to moderately fossiliferous decreasing with depth, planar bedding of variable widths No Recovery 170.8-171.0'	R22: 7 minutes	
171.0		NR	>5 >10				
175 -131.9	R23-NQ 5 ft 100%	45	3 3 1		Limestone 171.0-176.0' - yellowish gray and dusky yellow in alternating zones of variable widths (<4"-6"), (5Y 7/2 and 5Y 6/4), fine to medium grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids <1/16" 10-20% of surface, trace organics, poorly to moderately fossiliferous (casts/molds)	R23: 5 minutes	
176.0			2				
180 -136.9	R24-NQ 5 ft 94%	73	2 1 2 2 NR		176.0-180.7' - Same as 171.0-176.0' except trace cavities to 1/2", trace light olive gray (5Y 5/2) laminae, zone of wavy bedding with possible cross bedding from 176.5-176.95' No Recovery 180.7-181.0'	R24: 6 minutes	
181.0			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 11 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
185 -141.9	R25-NQ 5 ft 92%	37	9 2 2 5 >10 NR	<p>163.95' - Fracture, 10 deg, rough, undulating, along bedding plane, <1/8" open</p> <p>164.05' - Fracture, 80-90 deg</p> <p>164.2, 164.25' - Fracture (2), 10 deg, rough, undulating, bedding plane</p> <p>164.35' - Fracture, 80-90 deg</p> <p>166.1, 166.15, 166.25' - Mechanical break (3), <5 deg, smooth, planar, bedding plane</p> <p>166.5' - Fracture, <5 deg, rough, undulating, bedding plane, 1/4" open</p> <p>116.7, 167.1, 169.1' - Mechanical break (3), <5 deg, smooth, planar, bedding plane, up to 1/8" open</p> <p>167.15-167.7' - Fracture, 80-90 deg, smooth, planar, bedding plane, up to 1/8" open</p> <p>168.15' - Fracture, <5 deg, rough, undulating, bedding plane, 1/4" open</p> <p>168.5' - Mechanical break</p> <p>168.7' - Mechanical break, <5 deg, smooth, planar, bedding plane</p> <p>169.45, 107.35' - Fracture (2), <5 deg, rough, undulating, undeveloped or healed, bedding plane fractures</p> <p>169.5' - Mechanical break, 10 deg, bedding plane</p> <p>169.6' - Fracture, 10 deg, rough, undulating, bedding plane</p> <p>169.8' - Mechanical break, <5 deg, smooth, planar, bedding plane</p> <p>171.45-171.55' - Fracture zone, intersecting fractures, up to 1/2" fragments</p> <p>171.85' - Fracture, <5 deg, rough, undulating, olive gray (5Y 3/2) organic staining on bottom surface, up to 1/2" open</p> <p>172.15' - Fracture, <5 deg, rough, undulating to planar, bedding plane, possible remineralization</p> <p>172.4' - Fracture, 10 deg, rough, undulating, bedding plane, possible remineralization</p> <p>172.5-172.6' - Fracture zone, intersecting fractures, up to 1/2" fragments</p> <p>172.8, 174.1' - Fracture (2), <5 deg, rough, undulating, bedding plane, possible remineralization, up to 1/8" open</p> <p>173.0' - Fracture, 50 deg, rough, undulating, less than 1/8" open</p> <p>173.1' - Fracture, 80-90 deg, rough, undulating, tight</p> <p>173.2' - Fracture, <5 deg, rough, undulating, bedding plane</p> <p>173.5' - Mechanical break</p> <p>174.75, 174.8' - Fracture (2), <5 deg, rough, undulating, bedding plane, possible remineralization, up to 1/4" open</p> <p>175.7-175.75' - Fracture, intersecting fractures, up to 1/4" fragments</p> <p>176.15' - Fracture, <5 deg, smooth, undulating, bedding plane, up to 1/8" open</p> <p>176.7, 177.4, 179.15' - Fracture (3), <5 deg, smooth, undulating, bedding plane, up to 1/4" open</p>	<p>Limestone</p> <p>181.0-185.6' - dusky yellow 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% increasing with depth, highly fossiliferous from 183.2-184.8', casts/molds up to 1/2", zones of planar bedding with variable thickness from 181.0-181.25', 182.9-183.2', and 184.7-185.6'</p> <p>No Recovery 185.6-186.0'</p> <p>Bottom of Boring at 186.0 ft bgs on 5/3/2007</p>	R25: 5 minutes		
186.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-04	SHEET 12 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
 WATER LEVELS : 5.5 ft bgs on 5/03/07 START : 5/2/2007 END : 5/3/2007 LOGGER : M. Faurote, N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
			177.25' - Fracture, vertical, rough, undulating 178.05' - Mechanical break 178.4' - Mechanical break 178.5' - Mechanical break 178.6, 179.35, 180.55' - Fracture (3), <5 deg, smooth, undulating, bedding plane, up to 1/8" open 179.25' - Fracture, <5 deg, smooth, undulating, bedding plane, tight 180.25' - Fracture, 50 deg, rough, undulating 181.05, 181.15, 181.6, 181.7, 181.9, 182.95' - Fracture (6), <5 deg, rough to smooth, undulating 181.4' - Fracture, 65-75 deg, rough, undulating 181.65' - Fracture, 85 deg, rough, undulating 181.8' - Fracture, 85 deg, rough, undulating, open up to 1/4" 182.4, 183.1, 184.1, 184.5' - Fracture (4), <5 deg, rough to smooth, undulating 183.05' - Fracture, 75-85 deg, rough, undulating 183.5' - Mechanical break 184.6' - Fracture, 60 deg, rough, undulating 184.85-185.6' - Fracture zone, <10 deg, rough to smooth, undulating, bedding plane fractures			



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-05	SHEET 1 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
42.6	0.0	1.3	SS-1	0-2-3 (5)	Poorly Graded Sand With Organics (SP) 0-1.3' - grayish black grading to medium light gray, (N2 to N6), moist, loose, very fine to fine grained, 20-30% organics, fines decreasing with depth, silica sand, roots		SS-1: First 6" was weight of hammer Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)
	1.5						
5	5.0	1.0	SS-2	2-3-3 (6)	Poorly Graded Sand (SP) 5.0-5.75' - pale yellowish brown, (10YR 6/2), moist to wet, loose, very fine to fine grained, 3% medium plastic fines, silica sand Fat Clay With Sand (CH) 5.75-6.0' - pale blue to pale olive, (5B 6/2 to 10Y 6/2), moist, medium stiff, high plasticity, no dilatancy, 20% very fine silica sand		
37.6	6.5						
10	10.0	1.2	SS-3	5-7-8 (15)	Clayey Sand (SC) 10-10.25' - pale blue to pale olive, (5B 6/2 to 10Y 6/2), moist, medium dense, fine to medium grained, 24% medium plasticity fines, iron cemented sand Poorly Graded Sand (SP) 10.25-11.2' - very pale orange, (10YR 8/2), wet, medium dense, very fine to fine grained, trace nonplastic fines, trace black mineral grains		
32.6	11.5						
15	15.0	1.0	SS-4	6-9-9 (18)	Poorly Graded Sand With Silt (SP-SM) 15.0-15.55' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), wet, medium dense, very fine to fine grained, 6% nonplastic fines, silica sand Sandy Lean Clay (CL) 15.55-16.0' - pale yellowish brown, (10YR 6/2), wet, very stiff, low to medium plasticity, slow dilatancy, 40-45% very fine to fine silica sand		
27.6	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-05	SHEET 2 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
							6"-6"-6" (N)
22.6	20.0	1.0	SS-5	6-9-10 (19)	Silty Sand (SM) 20.0-21.0' - pale yellowish brown, (10YR 6/2), wet, medium dense, very fine to fine grained, 30-40% nonplastic fines, silica sand		
	21.5						
25	25.0	1.0	SS-6	6-7-6 (13)	Silty Sand (SM) 25.0-26.0' - Same as 20.0-21.0'		
17.6	26.5						
30	30.0	1.3	SS-7	4-6-8 (14)	Lean Clay (CL) 30.0-31.3' - pale yellowish brown to dark yellowish brown becoming greenish gray in last 0.1', (10YR 6/2 to 10YR 1/2 to 5G 6/1), moist, stiff, medium plasticity, no dilatancy, 5-10% very fine silica sand		
12.6	31.5						
35	35.0	1.2	SS-8	4-4-4 (8)	Silty Sand (SM) 35.0-36.2' - light olive gray, (3Y 5/2), moist to wet, loose, very fine to fine grained, 30% low plastic fines, silica sand, medium bluish gray (5B 5/1) clay lens from 35.4-35.6'		
7.6	36.5						
40							



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.6	40.0	1.5	SS-9	2-4-5 (9)	[Diagonal Hatching]	
	41.5					
45	45.0	1.5	SS-10	0-1-2 (3)	[Diagonal Hatching]	
-2.4	46.5					
50	50.0	1.5	SS-11	3-4-7 (11)	[Vertical Hatching]	
-7.4	51.5					
				Silty Sand (SM) 50.0-50.65' - dark gray, (N3), moist to wet, medium dense, very fine to fine grained, 17% low plastic fines, possible organics, 1/4" clayey organic seam, silica 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 HCl reaction, carbonate Organic Soil (OL) 51.4-51.5' - Same as 50.65-50.85' except olive black, (5Y 2/1)		
55	55.0	1.5	SS-12	14-27-36 (63)		
-12.4	56.5			Silt With Sand (ML) 55.0-56.5' - light olive gray, (5Y 5/2), moist, hard, low plasticity, rapid dilatancy, mild HCl reaction, 20% very fine to fine sand, trace organics		
60						Driller's Remark: Harder drilling at 59.0'



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
-17.4	60.0	1.5	SS-13	26-29-30 (59)	Silty Sand And Limestone (SM) 60.0-61.5' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plastic fines, 30-40% gravel-sized lime stone, 1/4" organic layer at 61.3'		Driller's Remark: Reports clay at 63.0'
	61.5						
65 -22.4	65.0	1.5	SS-14	2-10-10 (20)	Elastic Silt (MH) 65.0-65.4' - moderate yellowish brown, (10YR 5/4), wet, very stiff, low to medium plasticity, rapid dilatancy, moderate HCl reaction, carbonate material Organic Soil (OH) 65.4-65.65' - brownish black, (5YR 2/1), moist, soft, high plasticity, slow dilatancy, no HCl reaction Limestone Fragments 65.65-66.50' - yellowish brown, (10YR 5/4), fine grained, mild HCl reaction		
	66.5						
70 -27.4	70.0	1.0	SS-15	11-16-7 (23)	Silt With Sand (ML) 70.0-71.0' - moderate yellowish brown, (10YR 5/4), wet, very stiff, low plasticity, rapid dilatancy, moderate HCl reaction, 15-20% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, carbonate material		Driller's Remark: Lost circulation at 73.5'
	71.5						
75 -32.4	75.0	1.1	SS-16	1-3-2 (5)	Silt With Sand (ML) 75.0-76.1' - moderate yellowish brown to dusky yellowish brown, (10YR 5/4 to 10YR 2/2), wet, medium stiff, fine to medium grained, low plasticity, rapid dilatancy, mild HCl reaction, trace fine gravel-sized limestone; organic seam at 75.85-76.0'		Driller's Remark: Hard zone 79.0-80.0'
	76.5						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-05	SHEET 5 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-37.4	80.0	0.9	SS-17	41-50-50 (100)	Silty Sand And Limestone (SM) 80.0-80.9' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild HCl reaction, 25% low plastic fines, 35% of sample is fine to coarse gravel-sized limestone fragments Begin Rock Coring at 81.5 ft bgs See the next sheet for the rock core log	Break for evening 17:30 on 4/10/2007	
80.8							
85 -42.4							
90 -47.4							
95 -52.4							
100							



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
81.5 -42.4	R1-NQ 4 ft 45%	13	>10 >10 NR	81.6' - Mechanical break, 75 deg, smooth, undulating 82.1-82.5' - Fracture zone (>5), rough, undulating, 2" gravel-sized fragments, angular 82.5-82.8' - Fracture or mechanical break, smooth, undulating, open with 1/2"-2" opening 83.0-83.2' - Fracture or mechanical break, very fine to fine grained	Limestone 81.5-83.3' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), voids increasing with depth along the surface 83.0-83.3' - yellowish gray, (5Y 7/2) No Recovery 83.3-85.5'	Continue drilling, switch to rock coring 04/11/07 at 08:00 R1: 8 minutes	
85 -42.4	R2-NQ 5 ft 8%	0	NR	85.5-85.9' - Fracture zone, rough, undulating, 1-1/2" gravel-sized fragments, mostly <1"		Limestone 85.5-85.9' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak to weak (R1 to R2), voids cover 5% surface area No Recovery 85.9-90.5'	R2: 2 minutes
90 -47.4	R3-NQ 5 ft 54%	24	>5 >10 0 NR	90.5-91.0' - Fracture zone (>5), smooth, undulating, 2" gravel-sized fragments, angular 91.5, 91.7, 92.4' - Fracture or mechanical break (3), smooth, undulating 93.0' - Mechanical break	Limestone 90.5-92.5' - Same as 85.5-85.9' except moderately fossiliferous (molds and casts) 92.5-93.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), small (1/16") voids over 5% of the surface, trace silt No Recovery 93.2-95.5'	R3: 8 minutes	
95 -52.4	R4-NQ 5 ft 100%	88	1 >2 4 2 >10	95.7' - Mechanical break 95.9, 96.8, 97.25, 97.6, 97.7, 98.1, 98.4, 98.5, 99.2, 100.3' - Fracture or mechanical break (10), 40 deg and 45 deg, rough, undulating, healed	Limestone 95.5-95.9' - light olive gray, (5Y 5/2), very fine to medium grained, moderate HCl reaction, very weak (R1), trace organics 95.9-100.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, weak (R2), small (1/16") voids cover 15% of the surface, large voids (3/16") cover less than 5% of the surface, trace organics	SC-1 collected at 95.9-96.7'	
100 -57.4			6	100.3-100.5' - Fracture zone (>10), 45 deg, rough, undulating, 2" diameter gravel fragments		SC-2 collected at 99.1-100.3' R4: 11 minutes	



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
105 -62.4	R5-NQ 5 ft 64%	30	6	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		[Symbolic Log]	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 cover 15-25%, few large (3/16") voids, weak zone (R1) at 102.6-102.7' No Recovery 103.7-105.5'	R5: 8 minutes
110 -67.4	R6-NQ 5 ft 85%	75	>10	101.5, 101.7, 101.9, 102.3, 103.0, 103.4' - Fracture or mechanical break (6), rough, undulating, open (3/4")					[Symbolic Log]	Limestone 105.5-109.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2, 10YR 5/4), fine grained, moderate HCl reaction, weak (R2), trace organics, small voids (<1/16") 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'	SC-3 collected at 108.3-109.8' R6: 10 minutes
115 -72.4	R7-NQ 5 ft 76%	38	>10	106.6, 107.1' - Mechanical break, tight		[Symbolic Log]	Limestone 110.5-112.4' - moderate yellowish brown, (10YR 6/4), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 1/16" voids cover 20-30% of the surface, larger voids (3/16") cover less than 5%, fossil molds and casts 112.4-114.3' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (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'	Driller's Remark: Water loss at 113.0' R7: 6 minutes
120 -77.4	R8-NQ 5 ft 68%	64	>5	107.4-107.6' - Fracture (4), horizontal, rough, undulating, small (1/2") fragments					[Symbolic Log]	Limestone 115.5-118.9' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), very fine to fine grained, moderate HCl 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 (10YR 7/4) below 117.0' No Recovery 118.9-120.5'	R8: 6 minutes
			1	108.0' - Fracture (2), 50 deg and 50 deg, rough, undulating, tight to open up to 3/16"				
			0	110.7-110.9, 111.4-111.7' - Fracture zone, horizontal and vertical, rough, undulating, 3/8" and larger size rock fragments				
			NR	111.1' - Fracture, 60 deg, rough, undulating, tight to open up to 1/16"				
			2	111.2' - Fracture, horizontal, smooth, undulating, open				
			NR	112.0' - Fracture, 70 deg, rough, undulating, intersecting, one is tight and other is open up to 1/16"				
			0	112.4' - Fracture, horizontal, rough and undulating on one face, smooth and undulating on the other, open				
			2	112.4' - Fracture, horizontal, rough and undulating on one face, smooth and undulating on the other, open				
			0	113.4' - Fracture, 65 deg, rough, undulating, open up to 1/16"				
			NR	114.0, 114.1' - Fracture, horizontal, rough, undulating, open, possible bedding plane				
			1	117.2, 117.4' - Fracture zone (>2), rough, undulating, up to 1/2" gravel-sized fragments, angular				
			0	118.1' - Fracture, horizontal, rough, undulating, tight to open up to 3/16"				
			NR					
			2	120.8, 121.0, 121.6, 121.9, 122.0, 122.3' - Mechanical break (6), rough, undulating				



PROJECT NUMBER: 338884.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

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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
125 -82.4	R9-NQ 5 ft 42%	24	4	120.8-120.9' - Fracture zone, rough, undulating, gravel-sized fragments <1/4" diameter, angular, no openings >1/4" 121.9, 122.0' - fit tightly with opening up to 1/16"		Limestone 120.5-121.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), small voids (1/16") cover 15% of the surface 121.0-122.6' - light olive gray, (5Y 5/2), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), small voids (1/16") cover 10-25% of the surface, moderately fossiliferous with fossil casts and molds about 5% of the surface No Recovery 122.6-125.5' Limestone 125.5-126.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), few small voids (1/16"), 3/4" thick of light olive gray 5Y 5/2 limestone (slow HCl, medium strong (R3) is present (interval unknown due to fractured nature of the interval) 126.4-129.0' - light olive gray and grayish orange, (5Y 5/2 and 10YR 7/4), mottled, fine grained, mild HCl reaction, weak to moderately strong (R2 to), moderately fossiliferous, few small voids (1/16") cover about 20% of the area, large voids and fossil molds/casts up to 3/8"x9/16" cover 5% at 127.2-127.4' is a zone of light olive grey (5Y 5/2) limestone, slow HCl reaction, medium strong to strong (R3 to R4), no small voids as fossil molds/casts, another 1" thick zone is present at about 129.0' No Recovery 129.0-130.5' Limestone 130.5-131.0' - pale yellowish brown and grayish orange, (10YR 6/2 and 10YR 7/4), mottled, fine grained, moderate to strong HCl reaction, very weak (R1), small voids (1/16") cover about 10%, 3/16" size cavities No Recovery 131.0-135.5' Limestone 135.5-136.0' - yellowish gray and grayish orange, (5Y 7/2 and 10YR 7/4), mottled, fine grained, mild HCl reaction, strong (R4), some thinly laminated bedding at 135.5-135.7', bedding angle 0-5 deg 136.0-136.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak (R0), very fossiliferous	R9: 5 minutes	
130 -87.4	R10-NQ 5 ft 70%	34	>10	125.5-126.4' - Fracture zone, horizontal and 70 deg, rough and smooth, undulating, rock fragments from 3/16"-1-1/2" in size, few fragment faces match together			126.8' - Fracture, 20 deg, rough, undulating, tight and open(1/8") 127.1-127.2' - Fracture, horizontal, rough, undulating, open, some small (1/2") fragments 127.4' - Fracture, horizontal, smooth, planar and undulating, open 127.6' - Fracture, horizontal, rough, undulating, tight with some openings up to 1/16" 128' - Fracture, horizontal, rough, undulating, tight with some openings up to 1/16" 128.7-129.0' - Fracture zone, horizontal, rough and smooth, undulating to planar, fragment faces do not fit together 130.55' - Fracture, horizontal, rough, undulating, open	Driller's Remark: Hard material at 128.0'
135 -92.4	R11-NQ 5 ft 8%	7	1	135.55' - Fracture, horizontal, smooth, planar and undulating, open				R10: 8 minutes
140 -97.4	R12-NQ 5 ft 22%	0	1	135.65, 135.75, 136.3, 136.35' - Fracture, horizontal, smooth, planar, tight to open up to 1/8", appear to be bedding plane				Driller's Remark: Soft material throughout the run
			>10	140.5-140.7' - Fracture zone, smooth, undulating, 1/2" fragments		R11: 1 minutes		
						R12: 4 minutes		



PROJECT NUMBER: 338884.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 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 : 4/10/2007 END : 4/18/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
145 -102.4	R13-NQ 5 ft 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 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 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, 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 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")	Driller's Remark: Become harder at 143.0' R13: 11 minutes Driller's Remark: Piece stuck in core, pullout, clean and then run last 2.0' R14: 22 minutes R15: 8 minutes R16: 5 minutes SC-4 collected at 160.5-161.4'	
150 -107.4	R14-NQ 5 ft 80%	20	>10 5 >10 2 NR	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, 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 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 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				
155 -112.4	R15-NQ 5 ft 66%	16	>10 >10 6 2 NR					
160 -117.4	R16-NQ 5 ft 46%	30	2 4 1 NR					
			1					



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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
165 -122.4	R17-NQ 5 ft 32%	28	6	153.7, 153.75' - Fracture (2), horizontal, smooth and undulating, rough and undulating, moderately tight 155.6' - Fracture, rough, planar, open 155.7-156.2' - Fracture, 70 deg, rough, undulating, tight and open (1/16") 156.7, 156.8' - Fracture, horizontal, rough, planar, open 157.2' - Fracture, 20 deg, rough, undulating, tight 157.4' - Fracture, 50 deg, rough, undulating, tight 157.6' - Fracture, 30 deg, rough, undulating, tight		Limestone 155.6-156.7' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4), small voids (<1/16") cover about 15% surface, moderately fossiliferous, few 3/16" fossil molds and casts 156.7-157.8' - dusky yellow, (5Y 6/4), fine grained, mild to moderate HCl reaction, very weak (R1), becoming weak to moderately strong (R2 to R3) by 157.6', laminated bedding 157.7-157.2', moderately fossiliferous, small voids (<1/16") cover about 5% surface area, few large voids	R17: 4 minutes
170 -127.4	R18-NQ 5 ft 64%	17	7	161.4' - Bedding plane, smooth, planar 161.8-162.1' - Bedding plane, horizontal, smooth, planar, open 165.5-165.9, 166.6' - Bedding plane (3), smooth, planar 166.2' - Fracture, horizontal, rough, undulating, open 166.4' - Fracture, horizontal, rough, undulating, open 166.7' - Fracture, 5 deg, smooth, undulating, open 167.1' - Fracture, 5 deg, rough, undulating, tight with open up to 3/16"		No Recovery 157.8-160.5' Limestone 160.5-162.1' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, moderate HCl reaction, medium strong (R3), small voids (<1/16") cover 15% of the surface area, few large voids (3/16") No Recovery 162.1-165.5' Limestone 165.5-166.3' - Same as 160.5-162.1' 166.3-167.2' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), small voids (<1/16") cover 50% of the surface area, few larger voids (3/16"), moderately fossiliferous, fragments of gray limestone (up to 3/8") inclusion from 167.0-167.2'	R18: 12 minutes
175 -132.4	R19-NQ 5 ft 84%	45	4	167.4, 167.9' - Fracture (2), horizontal, rough, undulating, open 167.7' - Fracture, 30 deg, rough, undulating, tight with open up to 1/16"		167.2-168.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, medium strong (R3), laminated bedding 168.0-168.2', small voids (1/16") cover 5% of the surface area No Recovery 168.7-170.5' Limestone 170.5-174.7' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), mild to moderate HCl reaction, strong (R4), voids (up to 1/16") cover 10% surface area, zone of increased small voids (20%) from 173.4-173.6', fewer larger voids (3/16") No Recovery 174.7-175.5' Limestone 175.5-177.0' - Same as 170.5-174.7' except increased amount of voids (30%) from 175.9 to 176.5'	R19: 13 minutes
180 -137.4	R20-NQ 5 ft 30%	7	4	170.8, 171.2, 172.0, 172.2' - Fracture (4), horizontal, rough, undulating 170.8-171.2' - Fracture, 80 deg, open up to 3/16" 171.7' - Fracture, horizontal and 40 deg, rough, undulating, dark 172.5' - Fracture, 50 deg, dark gray, tight with open up to 3/16" 172.7' - Fracture, horizontal, smooth, undulating, open 173.0-173.8' - Fracture zone, horizontal and vertical, rough, undulating, dark, many 3/16"-2" size fragments, some faces are smooth and planar 174.0, 174.1, 174.2' - Fracture (3), 5 deg, rough, undulating, open 174.4' - Fracture, 60 deg, smooth, undulating, tight		No Recovery 177.0-180.5'	R20: 6 minutes
			5	174.4' - Fracture, 60 deg, smooth, undulating, tight 175.8, 175.9' - Fracture or mechanical break, 20 deg and 30 deg, rough, undulating, tight 175.8-176.0' - Fracture, vertical, rough, undulating, open 176.1-176.3' - Fracture zone, rough, undulating, several 1" size fragments, no identifiable fracture angle 176.3, 176.4, 176.5, 176.55, 176.65' - Fracture, horizontal, rough, undulating, open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-05	SHEET 11 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
185 -142.4	R21-NQ 5 ft 72%	45	0	176.7, 177.0' - Fracture, horizontal, smooth, planar, open 180.6, 180.7, 180.8, 180.9, 181.5, 181.6, 181.7' - Fracture (7), horizontal, smooth, planar to undulating, openings ranging from 1/16"-3/8", no faces match to other 181.4' - Fracture, horizontal, smooth, undulating, open 183.4' - Fracture, horizontal, rough, undulating, open 183.7-184.1' - Fracture zone, horizontal and vertical, rough and undulating, smooth and planar, 1/2"-1- 1/2" size rock fragments		Limestone 180.5-180.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), thinly laminated bedding, few small voids (<1/16") 180.8-181.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, very weak (R1), thinly laminated bedding (10 deg angle), zone of olive gray (5Y 3/2) lamination about 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	SC-5 collected at 181.7-183.4' R21: 9 minutes
185.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-06	SHEET 1 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.8	0.0	1.1	SS-1	1-1-2 (3)	Poorly Graded Sand With Silt (SP-SM) 0.0-1.1' - brownish black, (5YR 2/1), moist, very loose, very fine to fine grained, color grades to light gray (N7) below 0.6', 6% nonplastic fines, organics decreasing with depth, silica sand		
5 37.8	1.5						
	5.0	1.0	SS-2	1-3-4 (7)	Sandy Fat Clay (CH) 5.0-6.0' - very light gray, (N8), moist, medium stiff, high plasticity, no dilatancy, with iron oxide staining (5.0-5.3'), 25-30% very fine grained, trace organic particles, silica sand		
	6.5						
10 32.8	10.0	1.5	SS-3	1-2-3 (5)	Sandy Lean Clay (CL) 10.0-11.5' - Same as 5.0-6.0' except thin light gray, (N7), medium plasticity, 41% fine sand, sandy seams		
	11.5						
15 27.8	15.0	1.1	SS-4	1-4-7 (11)	Sandy Fat Clay (CH) 15.0-15.2' - Same as 5.0-6.0' Silt (ML) 15.2-16.1' - grayish orange, (10YR 7/4), moist, soft, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5% very fine sand-sized, carbonate material		First reaction to HCl
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-06	SHEET 2 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.8	20.0	1.3	SS-5	3-4-5 (9)	Clayey Sand (SC) 20.0-21.3' - yellowish gray, (5Y 8/1), moist to wet, loose, very fine to fine grained, no HCl reaction, 18% medium to high plastic fines, silica sand		
	21.5						
25	25.0	1.3	SS-6	8-20-49 (69)	Clayey Sand (SC) 25.0-25.2' - Same as 20.0-21.3' except dark yellowish brown, (10YR 4/2), clay lens Silty Sand With Limestone (SM) 25.2-26.3' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist to wet, very dense, low plasticity, moderate HCl reaction, 15-20% low plastic fines, fine gravel-sized limestone, fine to coarse sand-sized, carbonate materials		
17.8	26.5						
30	30.0	1.5	SS-7	31-31-55 (86)	Silty Sand With Limestone (SM) 30.0-31.1' - Same as 25.2-26.3' Silt (ML) 31.1-31.5' - light brown, (5YR 6/4), moist, hard, low plasticity, rapid dilatancy, mild HCl reaction, trace very fine sand-sized, carbonate material		
12.8	31.5						
35	35.0	1.3	SS-8	39-47-45 (92)	Silty Sand (SM) 35.0-36.3' - dark yellowish brown, (10YR 4/2), moist, very dense, fine to coarse grained, mild to moderate HCl reaction, 30% nonplastic fines, trace to 10% fine gravel-sized limestone, carbonate material		
7.8	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-06	SHEET 3 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
2.8	40.0 40.6	0.6	SS-9	56-50/1 (106/7")	Sandy Silt (ML) 40.0-40.6' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), mottled, moist, hard, fine to coarse grained, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 38% fine to coarse sand-sized, trace fine gravel-sized, carbonate material		
45 -2.2	45.0 45.8	0.3	SS-10	36-50/4 (86/10")	Sandy Silt (ML) 45.0-45.8' - Same as 40.0-40.6' except 1/4" thick vertically extended black organic seam from 45.4-45.8'		
50 -7.2	50.0 51.5	0.2	SS-11	25-43-45 (88)	Sandy Silt (ML) 50.0-51.2' - yellowish gray, (5Y 7/2), moist, hard, fine to coarse grained, nonplastic, rapid dilatancy, mild HCl reaction, 33% fine to coarse sand-sized, trace gravel-sized, carbonate material, trace organics		
55 -12.2	55.0 55.8	0.8	SS-12	43-50/4 (93/10")	Silt With Sand (ML) 55.0-55.8' - Same as 50.0-51.2' except grading to moderate brown, (5YR 4/4), 10-15% sand-sized and thin organic lenses		
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-06	SHEET 4 OF 11
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
-17.2	60.0	0.1	SS-13	50/1.5 (50/1.5")	Limestone Fragments 60.0-60.1' - yellowish gray, (5Y 7/2), fine to coarse grained, mild to moderate HCl reaction, sand-sized fragments		
65 -22.2	65.0 83.2	0.2	SS-14	50/2.0 (50/2.0")	Limestone Fragments 65.0-65.2' - Same as 60.0-60.1'		
70 -27.2					Begin Rock Coring at 66.0 ft bgs See the next sheet for the rock core log		
75 -32.2							
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
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS				
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION							
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS							
66.0	R1-NQ 5 ft 78%	5	1	66.0' - Fracture, horizontal, rough 66.2' - Fracture, horizontal, rough 66.4' - Fracture, 45 deg, rough, semi planar 66.6, 66.8, 67.3' - Fracture, 45 deg and 60 deg, non-planar		Limestone 66.0-69.9' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, weak (R2), dissolution along bedding plane lamination, spaced (1/16"-1/4"), voids (1/16"-3/16") cover 10% surface No Recovery 69.9-71.0'	Numerous low angle to vertical healed fractures				
70 -27.2				8				4	68.1-68.2' - sandy interbed 68.1, 68.5, 68.8, 68.9' - Fracture (4), rough, undulating, irregular, non-planar 69.0-69.9' - Fracture zone (>10)		
71.0		NR									
75 -32.2		R2-NQ 5 ft 72%	>10	>10				71.0-72.0' - Fracture zone, fragments 72.0-73.0' - Fracture zone, fragments		Limestone 71.0-72.3' - Same as 66.0-69.9' except very weak (R1), increasing percent small voids, friable 72.3-75.6' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, very weak to weak (R1 to R2), finely laminated, trace voids/cavities, dissolution texture along the bedding plane (1/4" thick) No Recovery 75.6-76.0'	R1: 5 minutes
76.0								23				1	73.1' - Fracture, vertical, rough, undulating
80 -37.2	7			74.1, 74.2, 74.4, 74.5, 74.6, 74.8, 74.8, 74.9' - Bedding plane or mechanical break (8), <5 deg, rough, planar, open <1/16"							
81.0	2			75.1-75.2' - Fracture or mechanical break, 80 deg and vertical, rough, planar, tight							
85 -42.2	R3-NQ 5 ft 46%	0				Limestone 76.0-78.3' - grayish yellow to orangish gray, (5Y 8/4 to 10YR 7/4), strong HCl reaction, weak (R2), voids (up to 1/16") cover 15-20% of the surface, cavities up to 3/4" diameter (10-20 per foot), fossil molds and solution cavities, dark brown /black staining on some larger cavities, light to dark gray fine grained inclusions, rip up clasts between 77.0-77.5', needle-like organic imprints on fracture surface, dark brown layering visible over 3/4" zone No Recovery 78.3-81.0'	Intact core 19.2" (76.1-77.7') break to reduce size SC-1 collected at 76.1-76.9'				
86.0		33	0	77.7-78.1' - Fracture zone, <1/2" fragments							
		NR									
	R4-NQ 5 ft 60%	4		81.1, 81.2, 81.4, 81.5' - Fracture or mechanical break (4), rough, irregular		Limestone 81.0-84.0' - Same as 76.0-78.3' except strong HCl reaction, voids (1/16") and cavities cover 15-25% of the surface, fossiliferous with molds and casts (lot more than molds) No Recovery 84.0-86.0'	R3: 4 minutes				
		37	2	82.1' - Fracture, rough, planar, dark gray/black, possible organic pyrite 82.4' - Fracture, rough, undulating 82.9-83.3' - Fracture zone, percent of large cavities (>1/2") increasing in this zone							
		NR									
		NR									



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

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

WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
90 -47.2	R5-NQ 5 ft 26%	7	NR		No Recovery 86.0-89.7'	Driller's Remark: 86.0-89.5' very soft; possible void, lost 20 % circulation, no recovery likely in this zone	
91.0			>10		Limestone 89.7-89.9' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, medium strong (R3), fossiliferous, voids (1/16"-1/8") cover 15-20% of the surface, trace oval cavities (up to 1/2") (possible fossil molds) molds and casts, black infilling in some voids, sharp contact with below	R5: 3 minutes	
95 -52.2	R6-NQ 5 ft 70%	15	2		89.9-91.0' - Fracture, rough, irregular fractures on 2-4" core pieces, 1"-2" zone of fragments 1/2"-1-1/2" in size (upper weathered/bleached)	Clay interbed 91.7-92.2'	
96.0			2		91.0-91.2' - Fracture zone, 3/4"-1-3/45" size fragments	SC-2 collected at 92.6-93.4'	
95 -52.2			1		91.6' - Fracture or mechanical break, rough, undulating	R6: 8 minutes Steady drill rate across run	
96.0			NR		91.7, 92.2' - Fracture, sharp contact between limestone and gravelly lean clay (CL) interbed	Driller's Remark: 100% loss of circulation at 97.0' below ground surface	
100 -57.2	R7-NQ 5 ft 14%	11	NR		92.7' - Fracture, planar and stepped, parting surface on end of core piece, fine laminations	R7: 3 minutes Driller's Remark: Possible void 100.0-102.0'	
101.0			0		93.5' - silt interbed (nonplastic)	Driller's Remark: Void at 100.0-102.0' based on barrel advancement ("fell"), setting temporary casing at 106.0'	
105 -62.2	R8-NQ 5 ft 20%	0	NR		93.9' - sharp contact with limestone	R8: 4 minutes	
106.0			NR		94.1' - Fracture or mechanical break, vertical, rough, undulating		
					Lean Clay (CL) 91.7-92.2' - yellowish gray, (5Y 7/2), medium plasticity, strong HCl reaction, few gravel-sized (1/4"-3/4") limestone fragments at 91.7-91.8', 25% fine silt 92.6-93.5' - yellowish gray, (5Y 7/2), strong HCl reaction, medium strong to strong (R3 to R4), fine grained silt		
					Limestone 92.2-92.6' - yellowish gray, (5Y 7/2), fine grained, weak (R2), finely laminated (1/10"-1/4")		
					Silt (ML) 93.5-93.9' - moderate yellowish brown, (10YR 5/4), nonplastic, few gravel-sized (1/16-3/16") limestone fragments (<10%)		
					Limestone 93.9-94.5' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, weak (R2), small voids cover 20-30% of surface		
					No Recovery 94.5-96.0'		



PROJECT NUMBER: 338884.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 on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -67.2	R9-NQ 5 ft 84%	39	1 >10 >10	106.8-107.7' - Fracture zone, limestone fragments 107.7-108.5' - Bedding plane, horizontal, smooth to slightly rough, planar, 1/2"-1" spacing	Limestone 96.0-96.7' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very weak (R1), fossiliferous, up to 1/16" voids cover 20-25% of surface, cavities/molds up to 1/2" cover 5-7%, easily broken by hand, punky texture No Recovery 96.7-102.0' Limestone Fragments 102.0-103.0' - Same as 96.0-96.7' except yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), 1"-2" fragments, medium strong to strong, almost conchoidal fracture No Recovery 103.0-106.0' Limestone 106.0-110.2' - grayish orange, (10YR 7/4), strong HCl reaction, very weak (R1), voids (1/16"-1/8") cover 10-15% of the surface, larger cavities/fossil molds (up to 1/2") cover less than 5% (variably spaced) but in concentrated in zones, white chalky carbonate infilling in some cavities/molds, limestone 1-1/2" fragments from 107.0-107.7', 1/2"-1" horizontal partings (bedding plane) from 107.7-108.5' No Recovery 110.2-111.0' Limestone 111.0-112.0' - Same as 106.0-110.2' except 1/2"-2" horizontal partings Silt (ML) 112.0-112.6' - grayish orange, (6YR 7/4), nonplastic, strong HCl reaction Limestone 112.6-113.1' - Same as 111.0-112.0' No Recovery 113.1-116.0' Limestone 116.0-120.9' - very pale orange, (10YR 8/2), medium to coarse grained, strong HCl reaction, very weak to weak (R1 to R2), up to 1/16" size voids cover 25% of the surface, 1/4" cavities and fossil molds cover up to 5% surface No Recovery 120.9-121.0' Limestone 121.0-126.0' - Same as 116.0-120.9' except slightly more competent, 123.5-126.0' zone of weak rock (R2)	R9: 5 minutes	
111.0			1 1 NR	109.4, 110.0' - Fracture (2), horizontal, rough, undulating			
115 -72.2	R10-NQ 5 ft 42%	0	>10 0 NR	111.0-112.0' - Bedding plane, <5 deg, rough, planar, 1/2"-2" spacing, open to 1/8"		Driller's Remark: 112.5-114.0' possible void	
116.0						R10: 2 minutes	
120 -77.2	R11-NQ 5 ft 98%	70	2 3 3 2	116.0-116.2' - Fracture zone, limestone fragments 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		Easily broken by hand "rotten rock"	
121.0				119.7-119.9' - Fracture zone, limestone fragments 120.2' - Fracture (60), rough, semi planar		R11: 4 minutes	
125 -82.2	R12-NQ 5 ft 100%	60	NR 4 2 0 2 1	120.9' - Bedding plane, horizontal, slightly rough, planar 121.3, 121.7, 121.8' - Fracture (3), horizontal, rough, undulating 121.9' - Fracture, 30 deg, rough, undulating 122.2' - Fracture, 45 deg, rough, semi planar 122.6' - Fracture, 45 deg, rough, semi planar 124.4, 124.7, 125.3' - Fracture or bedding plane (3), horizontal, slightly rough, undulating, open to <1/8"		R12: 4 minutes	
126.0							



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
130 -87.2	R13-NQ 5 ft 88%	45	1 3 3 3 3 NR		Limestone 126.0-130.4' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), small voids (1/16-1/8") cover variable percent of surface area, cavities up to 1/2" cover less than 5% of surface, easily broken by hand, fossil molds filled with white chalk carbonate material, at 129.9' abrupt color change to very light yellowish gray (5Y 8/1) No Recovery 130.4-131.0'	SC-3 collected at 126.6-127.6' R13: 5 minutes	
135 -92.2	R14-NQ 5 ft 66%	33	>10 1 >10 0 NR		Limestone 131.0-133.3' - Same as 126.0-130.4' 133.3-134.3' - pale olive gray to dusky yellow, (10Y 6/2 to 5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), trace fine lamination (<1/16") No Recovery 134.3-136.0'	R14: 6 minutes	
140 -97.2	R15-NQ 5 ft 40%	0	>10 >10 NR		Limestone 136.0-138.0' - very light gray, (N8), strong HCl reaction, weak to medium strong (R2 to R3), cavities lenticular in shape up to 3/4", fossil casts and molds up to 1/2" (gastropod) No Recovery 138.0-141.0'	Driller's Remark: Void 135.0-138.0' R15: 5 minutes	
145 -102.2	R16-NQ 5 ft 60%	15	>10 >10 >10 NR		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 (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles No Recovery 144.0-146.0'	R16: 12 minutes	



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
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.2	R17-NQ 5 ft 74%	29	>10 2 2 3 NR	146.0-147.0' - Bedding plane, horizontal, planar, numerous partings spaced at 1/2"-1-1/2" apart 147.3' - Fracture, 60 deg, rough, undulating, semi planar fracture 147.6' - Fracture, 30 deg, rough, semi planar 148.2' - Fracture, 10 deg, rough, planar 148.3' - Fracture, 50 deg, slightly rough, semi planar 149.4-149.7' - Bedding plane, horizontal, planar	Limestone 146.0-147.0' - dark yellowish orange, (10YR 8/6), coarse grained, strong HCl reaction, weak (R2), friable disaggregates into medium sand-sized particles, numerous small voids over 30% of surface 147.0-149.4' - medium gray to yellowish gray, (N5 to 5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong (R3), 1/16"-3/16" size voids concentrated in thin (<1/10") horizontal zones spaced at 6"-1.2' apart 149.4-149.7' - moderate yellow brown and yellowish gray, (10YR 5/4), laminated, contorted wavy bedding planes No Recovery 149.7-151.0' Limestone 151.0-155.5' - light olive gray to yellow gray, (5Y 5/2 to 5Y 7/2), moderate HCl reaction, very weak to weak (R1 to R2), sparse voids (1/16"-1/8"), and cavities (up to 1/2") above 152.5', percent of voids increase beyond 152.5', 25-30% porous by volume, somewhat friable disaggregates into medium sand-sized particles, voids/cavities oriented horizontally, cavities increase in size (up to 1-1/4") with depth No Recovery 155.5-156.0' Limestone Fragments 156.0-156.4' - Same as 151.0-155.0' except slough Limestone 156.4-157.7' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, weak (R2), very small voids (1/16"), fossiliferous (1/16"-1/8") 157.7-159.0' - yellowish gray to grayish yellow, mottled with light gray, (5Y 7/2 to 5Y 8/2 mottled with N7), very fine to medium grained, strong HCl reaction, medium strong (R3), sharp contact No Recovery 159.0-161.0' Limestone 161.0-162.4' - medium gray, (N 5), moderate HCl reaction, medium strong (R3), with thin yellowish gray lamination zones of small cavities (<3/4"), 6"-8" spacing otherwise tight and dense, sharp contact	SC-4 collected at 148.3-149.4' R17: 7 minutes	
155 -112.2	R18-NQ 5 ft 90%	33	2 3 9 4 3 NR	151.1' - Fracture, horizontal, rough, undulating 151.3' - Fracture, vertical, rough, undulating to non planar, 3" long 152.1' - Fracture or mechanical break, 60 deg, rough, undulating 152.1, 152.5' - Fracture, horizontal, rough 153.0, 155.5' - Fractures (2), horizontal, rough, planar to undulating		R18: 5 minutes	
160 -117.2	R19-NQ 5 ft 60%	35	2 1 1 NR	156.0-156.4' - Fracture zone, limestone fragments 156.4, 156.7' - Bedding plane, horizontal, smooth, planar 157.5' - Fracture or mechanical break, 15 deg, rough, undulating 157.7' - Fracture, sharp contact with grayish yellow limestone (surfaces do not match) 158.9' - Fracture, horizontal, smooth, planar		Redox changes possibly R19: 7 minutes	
165 -122.2	R20-NQ 5 ft 88%	0	4 3 >10 >10 NR	161.3, 161.4, 161.5' - Bedding plane (3), horizontal, smooth, planar 161.9' - Fracture, horizontal, rough, planar 162.5-162.6' - Fracture zone, contact with olive brown limestone, limestone fragments 162.7' - Fracture or mechanical break, vertical 162.9' - Fracture, horizontal, rough, non planar 163.3, 163.4, 163.5, 163.6' - Fracture (4), horizontal, smooth, planar 163.5-163.8' - Fracture zone, limestone fragments		Change in redox conditions R20: 9 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
170 -127.2	R21-NQ 5 ft 88%	40	>10	164.2-165.4' - Fracture, <25 deg and >70 deg, non planar		Limestone 162.4-163.4' - moderate olive brown, (5Y 4/4), medium strong to strong (R3 to R4), voids (1/16-1/8") cover 20-30% of surface, horizontally oriented cavities (up to 1") in zones, thin medium gray limestone fragments 163.4-163.6' - medium strong to strong (R3 to R4) 163.6-165.4' - moderate olive brown, (5Y 4/4), coarse grained, moderate HCl reaction, medium strong (R3), fossiliferous, voids (1/16-1/4") cover 5-25% of surface No Recovery 165.4-166.0' Limestone 166.0-170.4' - grayish yellow, (5Y 8/4), fine grained, weak (R2), poorly fossiliferous, 1/16"-1/8" voids over less than 10% of surface in thin zones (1/2"-1-1/2" thick) on 1.0-1.5' spacing, cavities (up to 1/2") sparse and occur in zones with higher void content, thinly bedded zones 4"-6" thick on 2.0-3.0' intervals, with fine grained zones rock is weak (R2) to medium strong (R3) No Recovery 170.4-171.0' Limestone 171.0-174.4' - grayish yellow grading to yellowish gray, (5Y 8/4 to 5Y 7/2), fine grained, moderate to strong HCl reaction, weak (R2), finer grained than above, voids (1/16"-1/8") concentrated in thin horizontal zones along bedding plane/lamination (1/16"-1/4") and very thin beds (1/2"-1-1/2") void rich zones, fine grained laminated zones, high void zones spaced at 1.0' No Recovery 174.4-176.0' Limestone 176.0-178.3' - moderate olive brown, (5Y 4/4), weak (R2), cavities ranging in size from 1/4"-1" cover 5-8% of surface, cavities elongated in horizontal direction, horizontal partings 1"-2" spacing in 177.3-178.3' 178.3-178.6' - moderate yellowish gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, medium strong to strong (R3 to R4), sharp contact with the above, interbed 178.6-180.4' - Same as 178.3-178.6' except olive brown, (5Y 4/4), strong HCl reaction, weak (R2), 1/16"-1/8" size voids cover 20-30% of surface, porous, laminated No Recovery 180.4-181.0'	R21: 10 minutes	
175 -132.2	R22-NQ 5 ft 68%	0	>10	166.0-166.5' - Fracture zone, limestone fragments				
180 -137.2	R23-NQ 5 ft 88%	42	1	166.5' - Fracture or mechanical break, horizontal, rough, undulating				
185 -142.2	R24-NQ 5 ft 100%	30	2	167.1-167.4' - Bedding plane, horizontal, smooth, 3/4" thick limestone fragments				
			3	167.7' - Bedding plane, horizontal				
			4	168.4, 168.5' - Fracture (2), horizontal, rough				
			2	168.5' - Fracture or mechanical break, 45 deg, smooth				
			NR	168.9' - Fracture, horizontal, rough, undulating				
			>10	169.1' - Bedding plane, horizontal, smooth				
			>10	169.4' - Fracture, horizontal, fine grained limestone				
			>10	169.4-169.7' - Bedding plane, horizontal, smooth, planar, limestone fragments (1/4"-1/2" thick)				
			>10	170.1-170.4' - Fracture, horizontal, slightly rough, fracture faces indicate partial recrystallization				
			NR	171.0-171.2' - Fracture zone, angular limestone fragments				
			NR	171.2, 171.4' - Fracture or mechanical break, horizontal, smooth, 45 deg fracture on 3" core piece				
			NR	171.4-171.8' - Mechanical break, 80 deg, rough, undulating, fracture is on a 5" core piece				
			1	171.8' - Fracture, horizontal, rough				
			3	171.9' - Mechanical break, 45 deg, rough				
			5	172.1-172.2' - Fracture zone, limestone fragments				
			4	172.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across the zone, parting interval range from 1/4"-4" with most between 1/2"-2", laminated to very thinly bedded limestone				
			2	176.3' - Fracture, horizontal, rough, undulating				
			NR	177.6, 177.7, 177.8' - Bedding plane (3), horizontal, smooth				
			NR	178.0, 178.1, 178.15' - Bedding plane (3), horizontal, smooth				
			1	178.3' - Fracture, horizontal, smooth, planar, contact with fine grained limestone				
			2	178.8' - Fracture, horizontal, smooth, planar, contact with void rich limestone below				
			9	178.8-179.0' - Fracture zone, limestone fragments				
			2	179.1' - Fracture or mechanical break, 75 deg, rough				
			3	179.6, 179.7' - Fracture, rough, non planar and undulating				
			2	179.95' - Bedding plane, horizontal, smooth				
			3	180.15' - Bedding plane, horizontal, smooth, planar				
			3	180.4' - Bedding plane, horizontal, smooth, planar				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 5.5 ft bgs on 5/02/07 START : 5/2/2007 END : 5/4/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					Limestone 181.0-186.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl 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	R24: 12 minutes Inclined laminations in sections, cross bedding possible Complete coring at 08:50 AM	
			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				



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-07	SHEET 1 OF 10
SOIL BORING 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
 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 bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
41.7	0.0	1.1	SS-1	1-2-2 (4)	<p>Organic Material (OL) 0.0-0.1' - plant roots</p> <p>Poorly Graded Sand (SP) 0.1-1.1' - olive gray to light olive gray, (5Y 3/2 to 5Y 5/2), moist, loose, no HCl reaction, silica present</p>	
	1.5					
5 36.7	5.0	1.0	SS-2	8-8-6 (14)	<p>Poorly Graded Sand With Silt (SP-SM) 5.0-6.0' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), wet, loose, no HCl reaction, mottling at 5.6-5.7'</p>	
	6.5					
10 31.7	10.0	0.9	SS-3	25-50/5 (75/11")	<p>Lean Clay (CL) 10.0-10.1' - pale blue, (5BP 6/2), low plasticity</p> <p>Organic Material (OL) 10.1-10.3' - brownish black, (5YR 2/1), contains roots</p> <p>Silt (ML) 10.3-10.9' - grayish yellow, (5Y 8/4), wet, soft, moderate to strong HCl reaction</p>	
	10.9					
15 26.7	15.0	0.4	SS-4	50/4.5 (50/4.5")	<p>Silt (ML) 15.0-15.4' - grayish yellow, (5Y 8/4), wet, soft to medium stiff, moderate to strong HCl reaction</p>	
	15.4					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-07	SHEET 2 OF 10
SOIL BORING 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
 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 bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
21.7	20.8	0.0	SS-5	50/3 (50/3")	Limestone Fragments 20.0' - grayish yellow, (5Y 8/4), mild HCl reaction, trace voids on fragment surfaces, trace fossil casts and molds, very little recovery		
25	25.0	1.0	SS-6	18-25-35 (60)	Silt With Sand (ML) 25.0-26.0' - grayish orange, (10YR 7/4), wet to moist, soft to medium stiff, delayed moderate HCl reaction		
16.7	26.5						
30	30.0	0.9	SS-7	4-13-6 (19)	Silty Sand (SM) 30.0-30.9' - dark yellowish orange, (10YR 6/6), wet, soft, delayed moderate HCl reaction		
11.7	31.5						
35	35.0	0.0	SS-8	50/2 (50/2")	Limestone Fragments 35.0' - few limestone chips recovered in split spoon, chips too small to assess		
6.7	35.2						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-07	SHEET 3 OF 10
SOIL BORING 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
 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 bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
1.7	40.0	1.3	SS-9	5-11-13 (24)	| | | | |	
	41.5					
45	45.0	0.3	SS-10	50/3 (50/3")	| | | | |	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
-3.3	45.3					
50	50.0	0.7	SS-11	8-2-1 (3)	| | | | |	
-8.3	51.5					
55	55.0	1.0	SS-12	4-10-2 (12)	| | | | |	
-13.3	56.5					
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-07	SHEET 4 OF 10
SOIL BORING 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
 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 bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-18.3	60.0	1.1	SS-13	9-5-5 (10)	<p>Silt With Limestone Fragments (ML) 60.0-61.1' - moderate yellowish brown, (10YR 5/4), wet, soft, delayed strong HCl reaction, organic black (N1) limestone fragments up to 3/4"</p>	<p>Driller's Remark: Keep losing circulation, now advancing casing to 60'</p>	
	61.5						
65 -23.3	65.0	0.9	SS-14	3-10-11 (21)	<p>Silty Limestone Fragments (GM) 65.0-65.9' - yellowish brown, (10YR 5/4), wet, medium dense, strong HCl reaction, limestone fragments up to 1"</p>		
70 -28.3	70.0	0.0	SS-15	50/0.75 (50/0.75")	<p>Limestone Fragments 70.0' - yellowish gray, (5Y 7/2), delayed mild to moderate HCl reaction, trace fossil casts/molds, few thin fragments 3/4"-1" Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log</p>	<p>Driller's Remark: Casing set to 70.0', will begin rock coring on 6/6/07</p>	
75 -33.3	70.1						
80							



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-28.3	70.0	R1-NQ 1.5 ft 60%	33	0	70.5, 70.8' - Mechanical break (2), <5 deg and 10-20 deg, rough, undulating, open 1/16" and tight, respectively	70.0-70.9' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, strong HCl reaction, medium strong (R3), voids (<1/16") over 5-10% of surface No Recovery 70.9-71.5'	Start coring at 08:00 on 6/6/07 Water level at 3.0' below ground surface R1: 1 minute Driller's Remark: Possible sand at bottom of run, could have resulted in loss of recovery SC-1 collected at 72.9-74.0'
71.5	NR		0	71.7, 72.0, 72.4-72.8' - Mechanical break (3)			
75	R2-NQ 5 ft 60%	28	0	1	73.0' - Fracture, 5 deg, smooth, undulating	71.5-74.5' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), medium to fine grained, strong HCl reaction, medium strong (R3), voids (<1/16") over 5-10% of surface, 10% cavities up to 5/8", black organic infill No Recovery 74.5-76.5'	R2: 4 minutes
-33.3			NR	0	74.0, 74.2' - Mechanical break (2), <10 deg, rough, undulating, open 1/8"		
76.5			NR	>10	76.5-76.7' - Fracture zone, rough, undulating, no visible orientation		
80			NR	0	78.1' - Mechanical break		
-38.3	R3-NQ 5 ft 96%	87	0	1	79.4, 79.6' - Mechanical break (2), <5 deg, rough, undulating, open	79.5-81.3' - Same as 76.5-79.5' except voids (<1/16") over 10-30% of surface	R3: 5 minutes
81.5			NR	0	80.1' - Fracture, 5 deg, smooth, undulating		
85			4	>10	81.6, 81.8, 82.0, 82.3' - Bedding plane or mechanical break (4), <10 deg, rough, undulating, tight to <1/16" open		
-43.3			NR	>10	82.5-83.0' - Fracture zone, rough, undulating, angles undeterminable		
86.5	R4-NQ 5 ft 40%	8	NR	NR	83.4' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight	82.6-83.5' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very strong (R5), trace surface voids No Recovery 83.5-86.5'	Core barrel got rock sample jammed in the barrel causing the lost recovery R4: 3 minutes
88.5			>10	>10	86.7' - Mechanical break, 5-10 deg, rough, undulating, tight		
90			>10	0	87.2-88.1' - Fracture zone, rough, undulating, angles between 70-90 degrees		
	R5-NQ 5 ft 82%	48	NR	0	88.4' - Mechanical break, <5 deg, rough, stepped, open 1/8"	86.5-90.6' - dusky yellow, (5Y 6/4), medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 80-75% of surface, surface cavities up to 1", trace amount of fossil casts and molds	
			NR	NR			



PROJECT NUMBER: 338884.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 on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-48.3			0				
	91.5		NR		No Recovery 90.6-91.5'	R5: 5 minutes	
			0		Limestone 91.5-94.8' - Same as 86.5-90.6'		
			0				
			0				
	R6-NQ 5 ft 82%	68	0				
			0				
95			1				
-53.3			NR		94.8-95.6' - dusky yellow, (5Y 6/4), medium to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), trace surface voids, organic staining	R6: 6 minutes	
			NR		No Recovery 95.6-96.5'		
			4		Limestone 96.5-98.4' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate HCl reaction, medium strong (R3), 15% surface voids	SC-2 collected at 97.0-98.0'	
			0				
	R7-NQ 5 ft 62%	48	0		98.4-99.6' - pale yellowish brown to very pale orange, (10YR 6/2 to 10YR 8/2), medium grained, strong HCl reaction, medium strong to strong (R3 to R4), voids (<1/16") over 20-40% of surface, cavities up to 1/2", fossil casts and molds		
100			NR		No Recovery 99.6-101.5'	R7: 5 minutes	
-58.3			NR		Limestone 101.5-102.7' - Same as 98.4-99.6' except increase in the number of surface cavities		
			0		No Recovery 102.7-106.5'		
			15				
	R8-NQ 5 ft 24%	15	NR				
105			NR				
-63.3			NR				
			0		Limestone 106.5-108.5' - grayish orange, (10YR 7/4), medium grained, strong HCl reaction, weak (R2), 15-20% surface voids	R8: 3 minutes	
			0				
			0				
	R9-NQ 5 ft 56%	40	1			SC-3 collected at 106.9-107.9'	
110			1				



PROJECT NUMBER: 338884.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 bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-68.3			NR		Limestone 108.5-109.3' - pale yellowish brown, (10YR 6/2), medium grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 20-40% of surface, no surface cavities	R9: 2 minutes	
111.5			>10		No Recovery 109.3-111.5'		
			0		Limestone 111.5-115.0' - Same as 108.5-109.3'		
	R10-NQ 5 ft 70%	43	>10				
115			2				
-73.3			NR		No Recovery 115.0-116.5'	R10: 3 minutes	
116.5			1		Limestone 116.5-117.5' - Same as 108.5-109.3'		
			NR		No Recovery 117.5-121.5'		
	R11-NQ 5 ft 20%	13	NR				
120			0		Limestone 121.5-123.4' - grayish orange, (10YR 7/4), medium grained, mild HCl reaction, weak to medium strong (R2 to R3), trace fossil casts and molds, voids (<1/16") over 15-20% of surface, cavities up to 1/4"	R11: 3 minutes	
-78.3			2				
			2				
	R12-NQ 5 ft 70%	48	1				
125			NR		No Recovery 125.0-126.5'	R12: 3 minutes	
-83.3			0		Limestone 126.5-127.9' - yellowish gray, (5Y 7/2), medium grained, mild HCl reaction, medium strong (R3), fossil casts and molds, voids (<1/16") over 20-30% of surface		
			0		No Recovery 127.9-131.5'		
	R13-NQ 5 ft 28%	13	NR				
130							



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-88.3								R13: 2 minutes
131.5								
	R14-NQ 5 ft 80%	33	2	131.5' - Fracture, 5 deg, rough, planar 131.6' - Fracture, 5 deg, smooth, planar 132.1' - Bedding plane or mechanical break, <5 deg, rough, planar, tight 132.5-133.1' - Bedding plane (multiple), <5 deg, rough, planar, open <1/16"			Limestone 131.5-135.5' - dusky yellow to grayish yellow, (5Y 6/4 to 5Y 8/4), medium grained, mild HCl reaction, medium strong (R3), organic staining, fossil casts and molds, voids (<1/16") over 20-40% of surface	
135			0	133.8' - Mechanical break or fracture 134.0-134.7' - Fracture zone				
-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
			NR					
136.5								
	R15-NQ 5 ft 84%	22	>10	136.5-137.3' - Fracture zone, rough, undulating, no visible orientation, organic staining 137.7-138.3' - Fracture zone, rough, undulating, no visible orientation			Limestone 136.5-137.1' - dusky yellow, (5Y 6/4), medium grained, weak to medium strong (R2 to R3), voids (<1/16") over 30-50% of surface, organic staining 137.1-140.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, voids (<1/16") over 10-15% of surface, organic staining, surface cavities up to 1"	
140			6	138.9, 139.4' - Mechanical break (2)				
-98.3			0	139.5-140.5' - Fracture zone, rough, undulating, no visible orientation			No Recovery 140.7-141.5'	R15: 7 minutes
			>10					
			NR					
141.5								
	R16-NQ 5 ft 90%	40	>10	141.5-142.5' - Fracture zone, rough, undulating, no visible orientation			Limestone 141.5-142.6' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), medium grained, mild HCl reaction, medium strong to strong (R3 to R4), 20-40% voids 142.6-144.5' - yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), 10% voids on surface	SC-4 collected at 143.4-144.5'
145			2	142.7' - Fracture, 5 deg, smooth, undulating				
-103.3			0	143.1' - Mechanical break 143.3' - Fracture, 15 deg, smooth, undulating 143.5-145.9' - Mechanical break (4), <5 deg, rough, undulating, open <1/16"				
			0	145.9' - Fracture, 70-80 deg, rough, undulating, tight				
			NR					
146.5								
			0	146.9, 147.5, 147.8' - Mechanical break (3), <5 deg, rough, undulating, tight			No Recovery 146.0-146.5'	R16: 7 minutes
			0					
	R17-NQ 5 ft 100%	97	0	148.8' - Mechanical break, <10 deg, rough, undulating to planar, open to 1/4"			Limestone 146.5-148.1' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 30-50% voids, trace cavities	
150								



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical

WATER LEVELS : 3.0 ft bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-108.3			0	150.2' - Mechanical break, <5 deg, rough, undulating	148.1-150.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, medium strong (R3), 10-15% voids, 10% cavities 150.5-151.5' - Same as 148.1-150.5' except yellowish gray, (5Y 7/2), 20-30% voids 151.5-154.0' - Same as 148.1-150.5' 154.0-155.4' - light olive gray, (5Y 5/2), fine grained, mild to moderate HCl reaction, weak (R2), 10-30% voids, trace cavities 155.4-155.9' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 20-40% voids 155.9-156.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), no voids No Recovery 156.2-156.5' Limestone 156.5-156.8' - Same as 155.9-156.2' 156.8-159.5' - light olive gray, (5Y 5/2), fine to medium grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4) No Recovery 159.5-161.5' Limestone 161.5-165.2' - Same as 156.8-159.5' except medium grained, mild HCl reaction, 20-40% voids No Recovery 165.2-166.5' Limestone 166.5-175.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), 10-20% voids, fossiliferous zone from 167.3-167.6' (molds and casts)	SC-5 collected at 149.4-150.3' R17: 5 minutes	
	151.5		1	150.4' - Fracture, 50-60 deg, rough, undulating, tight			
			2	151.1' - Bedding plane or fracture, 5 deg, smooth, undulating, trace silica sand infill			
			0	151.6' - Bedding plane or fracture, 5 deg, rough, undulating			
			0	151.7' - Fracture, <5 deg, rough, undulating			
			0	152.2' - Bedding plane, <5 deg, rough, undulating to planar, tight			
			>10	152.7-153.2' - Fractures, 55-65 deg, rough, undulating, open <1/16" to partially healed			
			3	154.7' - Mechanical break, 5-10 deg, rough, undulating			
			NR	155.0-155.9' - Fracture zone, possibly mechanical breaks			
			>10	156.5-157.7' - Fracture zone, dominantly <10 deg, angular to subangular fragments 1"-3-1/2"			
			0	157.7-158.2' - Mechanical break (3), rough, undulating, open <1/8"			
			0	158.7, 159.0' - Mechanical break (2), <10 deg, rough, undulating to planar, open			
			NR				
			0	161.5-161.6' - Mechanical break, multiple breaks, no visible orientation, limestone fragments to 1"			
			>10	161.9' - Mechanical break or fracture			
			0	162.3-163.2' - Fracture zone, rough, undulating, angles undeterminable			
			0	163.4, 164.5' - Mechanical break (2)			
			NR				
			0	167.0, 167.4' - Mechanical break or fractures (2)			
			0	167.8, 167.9, 168.3' - Mechanical break or fractures (3)			
			4	168.7-169.0' - Fracture, 10-30 deg, rough, undulating			
				169.3, 169.6, 170.0' - Mechanical break (3)			



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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 6/06/07 START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-128.3			1				
171.5			0			R21: 5 minutes	
			>10				
			>10				
	R22-NQ 5 ft 80%	7	>10				
175 -133.3			>10				
			NR		No Recovery 175.5-176.5'	R22: 5 minutes	
176.5			3		Limestone 176.5-176.7' - Fracture zone, irregular, angular rock fragments to 1"		
			2		177.3' - Fracture, 30 deg, rough, planar 177.4' - Fracture, horizontal, rough, planar 177.8-178.1' - Fracture zone, irregular angular rock fragments, top and bottom fractures are horizontal, rough, planar		
	R23-NQ 5 ft 90%	37	3		178.6, 179.1, 179.4' - Fractures (3), 0-5 deg, rough, planar 179.5' - Fracture, 50 deg, rough, undulating		
180 -138.3			1				
			4		180.5, 180.6, 180.85, 180.9' - 0-10 deg, rough, planar	R23: 5 minutes	
			NR				
			1		181.5-182.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, weak to medium strong (R2 to R3), 10-30% voids		
			1		182.3' - Fracture, 30 deg, rough, undulating, possible mechanical break 182.9' - Fracture, 20 deg, smooth, planar		
	R24-NQ 5 ft 94%	72	4		182.5-185.0' - pale yellowish brown, (10YR 6/2), fine grained, medium strong (R3), 10-20% voids, trace cavities	Used natural break at 183.75' to box to preserve specimen	
185 -143.3			1		183.75' - Fracture, 60 deg, rough, undulating 184.1' - Fracture, horizontal, rough, undulating 184.3' - Fracture, 10 deg, smooth, planar 184.4' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth, undulating	R24: 7 minutes	
			2		185.0-186.2' - pale yellowish brown, (10YR 6/2), fine to medium grained, weak to medium strong (R2 to R3), 20-40% voids, 20-30% cavities up to 5/8", fossil casts and molds		
			NR		185.7' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 5 deg, rough, undulating		
					No Recovery 186.2-186.5' Bottom of Boring at 186.5 ft bgs on 6/7/2007	Bottom of hole at 186.5', end of boring at 09:53, 6/7/07	



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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.4						Start drilling at 10:57 AM using 3-7/8" drag bit Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)
37.4	3.5	1.0	SS-1	3-3-4 (7) Silty Sand (SM) 3.5-4.5' - dark yellow, (10YR 6/6), wet, loose, fine grained silica sand, 15% nonplastic fines, trace organics		Driller's Remark: Silts and sands at 7.0', harder drilling
32.4	5.0					
27.4	8.5	1.5	SS-2	4-7-6 (13) Silty Sand With Limestone Fragments (SM) 8.5-10.0' - yellowish gray mottled with light brown, (5Y 8/1 with 5YR 5/6), wet, medium dense, fine to coarse grained, strong HCl reaction, 20% nonplastic fines, 15% fine to coarse gravel sized limestone fragments, carbonate material		Driller's Remark: Switch to 3-7/8" tri-cone roller drill bit
22.4	10.0					Driller's Remark: Hard drilling at 11'
17.4	13.5	1.5	SS-3	10-5-6 (11) Silty Sand (SM) 13.5-15.0' - Same as 8.5-10.0' except 40-45% fine to coarse gravel sized, 35% fine to coarse sand sized, 15-20% nonplastic fines		
12.4	15.0					
7.4	18.5	1.5	SS-4	4-6-6 (12) Silty Sand With Limestone Gravel (SM) 18.5-20.0' - Same as 8.5-10.0'		
2.4	20.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 2 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
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.4						
23.5						
25	1.5	SS-5	4-21-29 (50)	Silt (ML) 23.5-25.0' - grayish orange, (10YR 7/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5% very fine grained sand-sized, carbonate material		Driller's Remark: Lost 40% circulation
17.4						
28.5						
30	1.0	SS-6	8-12-11 (23)	Silt (ML) 28.5-29.5' - Same as 23.5-25.0' except 15-20% fine to coarse sand-sized		
12.4						
33.5						
35	1.0	SS-7	21-18-21 (39)	Silt With Sand (ML) 33.5-34.5' - pale brown to pale yellowish brown, (5YR 5/2 to 10YR 6/2), dry to moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 20-25% fine to coarse sand-sized, trace fine gravel-sized		Set 4" HW casing to 35.0'
7.4						
35.0						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
38.5						
40	1.4	SS-8	20-23-19 (42)			
40.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 3 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
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DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.4				Silt With Sand (ML) 38.5-39.9' - moderate yellowish brown, (10YR 5/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15-20% fine to coarse sand-sized, carbonate material		
43.5	0.0	SS-9	50/1.5 (50/1.5")	No Recovery 43.5-43.6'		Driller's Remark: Slow drilling through dense zone, light chatter
45 -2.6						Driller's Remark: Softer drilling, quick drilling, little to no chatter
48.5	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, carbonate material		Driller's Remark: Rapid advancement no chatter
50 -7.6						
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 -12.6						
58.5	1.2	SS-12	25-35-41 (76)	Sandy Silt (ML) 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" thick		
60	60.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 4 OF 10
SOIL BORING LOG		

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 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 bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-17.6							Light chatter to 61.0'
63.5							Driller's Remark: Rapid advancement, no chatter, few cemented silt grains (coarse to fine gravel size) in cuttings
65	1.3	SS-13	28-33-21 (54)	Sandy Silt And Limestone (ML) 63.5-64.8' - Same as 58.5-59.7' except 35-40% of sample is limestone fragments			
-22.6	65.0						Driller's Remark: Light to moderate chatter Steady advancement, cemented silt to limestone fragments in cuttings Slow advancement from 66.0'-68.0'
							Driller's Remark: Light to no chatter
68.5							Moderate chatter
68.6	0.0	SS-14	50/1 (50/1")	No Recovery 68.5-68.6' Begin Rock Coring at 68.5 ft bgs See the next sheet for the rock core log			Switch to NQ tooling at 68.5' 16:20 PM begin cleaning boring with NQ tooling
70							
-27.6							
75							
-32.6							
80							



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 ORIENTATION : Vertical
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
70 -27.6	68.5 R1-NQ 1.5 ft 47%	0	4	68.75' - Mechanical break, 10 deg, smooth, undulating	Limestone 68.5-69.2' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, weak to medium strong (R2 to R3), fossiliferous, trace 15% organics No Recovery 69.2-70.0'	68-70' advancement slow with heavy chatter 68.5-69', little to no chatter 69.0-70.0' R1: No time recorded	
	70.0	NR	68.85, 69.0, 69.1, 69.2' - Mechanical break (4), 10 deg, smooth, undulating				
	R2-NQ 5 ft 66%	38	>10	70.55- 70.8' - Fracture zone, rough, stepped, no visible orientation	Limestone 70.0-73.3' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), fossiliferous, voids up to 3/16" cover 50% of surface No Recovery 73.3-75.0'	R2: 6 minutes 2/20/07 Stop drilling for the day Resume drilling 2/21/07 at 08:13 SC-1 collected at 76.3-77.4'	
		5	70.8-71.15' - Mechanical break, vertical, smooth, undulating				
		1	71.15' - Mechanical break, 25 deg, rough, undulating				
		1	71.3-71.45' - Mechanical break, vertical, smooth, undulating				
		NR	71.5' - Mechanical break 71.75' - Mechanical break, <10 deg, rough, undulating 72.5' - Fracture, 50 deg, smooth, undulating				
75 -32.6	75.0	57	1	75.1' - Mechanical break, <10 deg, smooth, undulating	Limestone 75.0-78.3' - light olive gray, (5Y 5/2), very fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), bedding plane laminations, some with organics (black laminations), voids up to 3/16" cover 25-50% of the surface No Recovery 78.3-80.0'	R3: 6 minutes	
		1	76.35' - Fracture, 20 deg, smooth, undulating				
	R3-NQ 5 ft 66%	1	77.4' - Fracture, 20 deg, smooth, undulating				
		3	78.05' - Mechanical break, 30 deg, smooth, undulating				
80 -37.6	80.0	38	NR	78.15' - Bedding plane, 10 deg, smooth, undulating, intersecting a vertical fracture 78.35' - Bedding plane, <10 deg, smooth, undulating	Limestone 80.0-82.8' - light olive gray, (5Y 5/2), very fine grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), moderately competent at 80.0-80.55' and 81.2-82.8', voids up to 3/16" over 50% of surface, fossiliferous, trace bedding plane laminations, very weak rock (R1) with very fine granular surface at 80.55-81.2' No Recovery 82.8-85.0'	Driller's Remark: Lost up to 80% circulation at 82.0' R4: 6 minutes	
		5	80.1' - Mechanical break, 80 deg, rough, undulating				
		1	80.3' - Bedding plane, <10 deg, smooth, undulating				
	R4-NQ 5 ft 56%	2	80.55' - Bedding plane, <10 deg, smooth, undulating 80.9-81.0' - Fracture zone, <10 deg, rough, undulating, multiple fractures				
		NR	81.2' - Fracture, 15 deg, smooth, undulating 82.5' - Mechanical break, <45 deg, rough, undulating 82.7' - Fracture, 65 deg, smooth, undulating				
85 -42.6	85.0	43	>10	85.0-85.45' - Fracture zone, rough, undulating, multiple fractures, multiple angles	Limestone 85.0-88.8' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine grained, mild to moderate HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/2" cover 20-30% of the surface, small voids (<3/16") cover 60-80% of surface, fossiliferous (molds/casts)		
		>10	85.45' - Mechanical break, 20 deg, rough, undulating				
	R5-NQ 5 ft 76%	2	85.75' - Fracture, 60 deg, smooth, undulating 86.0' - Mechanical break, 25 deg, rough, undulating 86.0-86.3' - Fracture zone, <20->70 deg, multiple fractures, rock fragments				



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 6 OF 10
ROCK CORE LOG		

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 ELEVATION : 42.4 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams
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 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
90 -47.6	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
95 -52.6	R6-NQ 5 ft 100%	45	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 fine grained, moderate HCl reaction, extremely weak to medium strong (R0 to R3), fossiliferous (casts/molds), trace organics throughout and in thin laminations at 91.0-94.55', voids up to 1/2" from 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 w/depth), extremely weak (R0) rock zone at 91.8-92.8', friable along bedding plane laminations	R6: 3 minutes	
			4	91.15, 91.4, 91.55, 91.8' - Bedding plane (4), <10 deg, smooth, undulating			
			8	92.05, 92.15, 92.25' - Mechanical break (3) 92.4, 92.8' - Bedding plane, <10 deg, smooth, undulating			
			2	92.7' - Fracture, 75 deg, smooth, undulating 92.9' - Fracture, 75 deg, smooth, undulating, mirror of fracture at 92.7			
			4	93.0' - Mechanical break, 10 deg, rough, undulating 93.25' - Mechanical break, 50 deg, rough, undulating			
			1	93.55, 94.25, 94.45' - Mechanical break (3), <10 deg and 50 deg, rough, undulating 94.55' - Bedding plane, smooth, undulating, organics 95.75' - Fracture, 20 deg, rough, undulating, low angle 96.25, 96.45, 96.65, 96.75' - Fracture (4), <10 deg, smooth, undulating			
100 -57.6	100.0		0 1 3 >10 NR	100.85' - Mechanical break 101.9, 102.15, 102.65, 102.9' - Fracture or bedding plane (4), <10 deg, smooth, undulating 102.9-103.6' - Fracture zone, rough, stepped, multiple intersecting fractures	Limestone 100.0-102.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, mild to moderate HCl reaction, weak (R2), voids (3/16") cover 30% of the surface decreasing w/depth to no voids, less than 5% voids from 102.15-102.9', fossiliferous with few small macrofossil molds, trace bioturbation and trace organics 102.9-103.6' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), silt to very fine sand-sized grains, bioturbation	R7: 7 minutes Driller's Remark: Lost 100% circulation at 100.0' SC-3 collected at 100.85-101.9'	
105 -62.6	105.0		5 >10 28 >10 6	105.8' - Mechanical break, 40-70 deg, rough, undulating 105.85-106.1' - Fracture zone, multiple intersecting fractures 106.35' - Fracture, 50 deg, rough, undulating 106.55' - Mechanical break 106.8' - Fracture, 75 deg, smooth, undulating	No Recovery 103.6-105.0'	R8: 11 minutes	



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ROCK CORE LOG		

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 ELEVATION : 42.4 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams
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DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
110 -67.6	110.0		NR	106.9-107.4' - Fracture zone, rough, stepped, multiple intersecting fractures 107.4, 107.7' - Fractures, 60 deg and 70 deg, rough, undulating 107.7-108.0' - Fracture zone, rough, stepped, gravel-sized rock fragments 108.35-108.7' - Fracture zone, rough, stepped		Limestone 105.0-108.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), rock strength varies along length of core, voids up to 3/16" cover 30-60% of the surface, cavities up to 1/4" rare, fossiliferous, few macrofossil casts and molds, trace bioturbation and organics No Recovery 108.7-110.0' Limestone	R9: 5 minutes
	R10-NQ 5 ft 48%	20	7	110.0-110.65' - Fracture zone, smooth, undulating, bedding plane and other intersecting fractures 111.25' - Fracture, 60 deg, smooth, undulating 111.5' - Fracture, 60 deg, smooth, undulating 111.75' - Bedding plane, <10 deg, smooth, undulating 112.0' - Fracture, 70 deg, smooth, undulating		No Recovery 108.7-110.0' Limestone 110.0-112.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), rock strength variable with depth, voids up to 1/2" rare, decreasing with depth, voids up to 3/16" over 80% of surface, fossiliferous with few macrofossils (casts/molds), trace organics No Recovery 112.4-115.0' Limestone	R10: 5 minutes
115 -72.6	115.0		5	115.1, 115.3, 115.45, 115.6' - Bedding plane (4), <10 deg, smooth, stepped		115.0-118.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids up to 1/2" is rare, voids up to 3/16" cover 70% of surface, fossiliferous with minor macro fossils (casts/molds), variable competence with rock weakness at breaks/ discontinuities No Recovery 118.7-120.0' Limestone	R11: 8 minutes
	R11-NQ 5 ft 74%	38	3	116.0' - Fracture, 50 deg, smooth, stepped 116.3, 116.45, 116.9, 117.05' - Bedding plane (4), <10 deg, smooth, undulating		120.0-121.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), cavities up to 1/2", voids up to 3/16" cover 30-80% of surface, fossiliferous, with macrofossils prevalent at 120.35-121.2' No Recovery 121.2-125.0' Limestone	R12: 5 minutes
			4	117.2' - Mechanical break, 20 deg, rough, stepped, open 1"			
			2	117.3, 117.55' - Mechanical break (2), <10 deg, smooth, undulating			
			NR	118.1, 118.4' - Fracture (2), 40 deg and 70 deg, smooth, undulating, trace staining on fracture at 118.4'			
120 -77.6	120.0		8	120.0-120.35' - Fracture zone, multiple intersecting fractures including a 60 deg fracture with trace staining			
	R12-NQ 5 ft 24%	0	1	120.65, 120.75, 121.05' - Mechanical break (3), 0-20 deg, rough, undulating			
			NR				
125 -82.6	125.0		>10	125.0-125.2' - Fracture zone, rough, undulating, multiple intersecting fractures		Limestone 125.0-126.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), very fine grained, mild HCl reaction, weak to medium strong (R2 to R3), cavities up to 1" cover 10-15% of surface, voids up to 3/16" cover 60-90% of surface, macrofossils (molds/casts) No Recovery 126.1-130.0' Limestone	
	R13-NQ 5 ft 22%		0	125.6' - Mechanical break, horizontal, rough, undulating			
			7	125.8' - Fracture or mechanical break, 40 deg, rough, undulating 125.95' - Mechanical break, horizontal, rough, undulating			
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 8 OF 10
ROCK CORE LOG		

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 ELEVATION : 42.4 ft (NAVD88) DRILLING CONTRACTOR : Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams
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DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
130 -87.6	130.0 R14-NQ 5 ft 30%	18	4 1 NR	130.05' - Fracture, rough, undulating, open 130.4' - Fracture, smooth, undulating, open 130.75' - Fracture or mechanical break, 20 deg, smooth, undulating 131.0' - Fracture or mechanical break, <10 deg, smooth, undulating 131.3' - Fracture, rough, undulating, open	█	Limestone 130.0-131.5' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" cover 50% of surface, few cavities up to 1/4" diameter, few macrofossil molds, potential gaps from fines washing out at 130.05', 130.4', and 131.3', 3/4" iron cemented sand (no HCl reaction, very fine grained, medium strong [R3]) at 130.0-130.05' No Recovery 131.5-135.0'	R13: 9 minutes 14:00-15:00 PM HW casing unscrewed at 10.0', removed NQ to retrieve HW 15:00-16:30 PM Advanced HW casing from 35.0'-70.0' 17:30-18:30 PM NQ tooling locked in slough at 100' below ground surface, back hammering to retrieve 18:00-18:30 PM little to no movement, stop for the day 2/21/07 Stop drilling for the day 2/22/07, 07:00-12:30 PM Retrieved tooling and cleaned out boring from 85.0-130.0' Advanced HW casing to 85.0' R14: 10 minutes Very fine sand-sized grains in drilling mud (identified by grit between fingers), black grains (possibly heavy minerals) present in grit only, not sample Continuous slow advancement through interval, no void R15: 13 minutes 15:15 PM 0.8'-long section of core retrieved from cutting shoe of core barrel, logged as R15 core from 138.0-138.8' 2/22/07 Stop drilling for the day at 140.0' Begin drilling 2/27/07 at 08:45
135 -92.6	135.0 R15-NQ 5 ft 24%	0	NR 0 NR	135.0, 135.2' - Fracture (2), <10 deg, smooth, undulating 138.15, 138.25' - Mechanical break, variable angles, variably open 138.25-138.65' - Fracture zone, coarse gravel-size rock fragments, visible signs of mechanical wear	█	Limestone 135.0-135.2' - pale yellowish brown to olive gray, (10YR 6/2 to 5Y 4/1), very fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" cover 30% of surface, possible worm burrows at 135.0-135.2' No Recovery 135.2-138.0' Limestone 138.0-138.8' - light olive gray to olive gray, (5Y 6/1 to 5Y 4/1), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), crystalline surfaces visible to naked eye, macrofossil molds up to 3/4"x1/4" (spiral gastropod), voids up to 3/16" variable 0-30% over surface, bedding plane laminations rare, trace organics No Recovery 138.8-140.0' Limestone 140.0-140.45' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), fine to medium grained, moderate to strong HCl reaction, extremely weak (R0), poorly competent with some silty sand and gravel, angular grains up to gravel size, trace bedding plane laminations and organics	R16: 10 minutes
140 -97.6	140.0 R16-NQ 5 ft 74%	23	>10 10 6 3 NR	140.0-140.25' - Fracture zone, rough, stepped, infilling 140.45' - Bedding plane, horizontal, rough, undulating, 1/4" open 140.9-141.6' - Fractures or bedding plane, 70-90 deg, rough, undulating 141.9' - Mechanical break, 10 deg, rough, undulating 141.95-142.1' - Fracture zone, 50-70 deg, smooth, undulating 142.2' - Bedding plane, horizontal, smooth, undulating 142.4' - Fracture, 70 deg, rough, undulating 142.6, 143.0, 143.2, 143.55' - Fractures (4), rough, stepped, variably open (<1/8")	█		
145 -102.6	145.0 R17-NQ 5 ft 70%	13	>10 8 5	145.0-145.45' - Fracture zone or mechanical break, rough, undulating 145.8, 146.1, 146.26, 146.35, 146.5, 146.6, 146.7' - Bedding plane (7), <10 deg, smooth, undulating 146.7-148.0' - Fracture, 70-90 deg, smooth to rough, undulating to stepped, with multiple intersecting bedding plane and subhorizontal fractures 148.1' - Fracture, 50 deg, smooth, undulating	█		



PROJECT NUMBER: 338884.FL	BORING NUMBER: E-08	SHEET 9 OF 10
ROCK CORE LOG		

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 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 ORIENTATION : Vertical
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
150 -107.6	150.0		NR	148.3' - Bedding plane, <10 deg, smooth, undulating to stepped, <1/4" open		140.45-143.7' - dark yellowish brown to grayish olive with light gray mottling, (10YR 4/2 to 10Y 4/2 with N7), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids over 30-40% of surface and vesicles over 60-80% of the surface, unfilled voids/cavities up to 1"x1/2" especially at 143.5-143.7', heavy bioturbation and secondary infill of voids No Recovery 143.7-145.0' Limestone	R17: 17 minutes
	R18-NQ 5 ft 84%	30	6	150.15' - Bedding plane, <10 deg, rough, undulating		145.0-145.45' - Same as 140.45-143.7'	
			5	150.3, 150.55, 150.6' - Bedding plane (3), <10 deg, rough, undulating		145.45-146.7' - light olive gray, (5Y 5/2), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" cover 20% of the surface, few macro fossils, laminated subhorizontal bedding with organics, minor bioturbation decreasing with depth	R18: 9 minutes
			8	150.7' - Mechanical break, 50-90 deg, rough, stepped		146.7-148.5' - Same as 145.45-146.7' except rare laminations, no to trace organics No Recovery 148.5-150.0 Limestone	155-156' Slow advancement
			5	151.05, 151.25, 151.5, 151.8, 152.05' - Bedding plane (5), rough, undulating		150.0-152.05' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 80-100% of surface, cavities up to 1/8" present	156-158' Slightly faster advancement
			1	151.95' - Mechanical break, vertical, rough, stepped		152.05-152.25' - Fracture, vertical, smooth, undulating, with 3 horizontal intersecting fractures	
155 -112.6	155.0		NR	152.5' - Fracture, 40 deg and 60 deg, rough, stepped		152.05-154.2' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids cover 0-30% of the surface increasing with depth, fossiliferous, bioturbation and secondary infill, iron staining rare No Recovery 154.2-155.0' Limestone	R19: 7 minutes
	R19-NQ 5 ft 72%	23	5	152.85' - Fracture, 10-70 deg, smooth, undulating		155.0-155.5' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	158-160' Slow advancement
			3	152.95' - Fracture, 75 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	Lost circulation at 160.0'
			5	153.1' - Mechanical break		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			5	153.4-153.65' - Fractures (4), 20-70 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			2	154.0' - Bedding plane, rough, undulating, <1/4" open		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	155.15, 155.45, 155.5' - Bedding plane (3), <10 deg, smooth to rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
160 -117.6	160.0		4	156.0' - Mechanical break, 20 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
	R20-NQ 5 ft 44%	7	8	156.15, 156.4' - Bedding plane, <10 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	Very slow, continuous advancement
			0	157.0' - Fracture, 75 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	157.2, 157.4, 157.6, 157.8, 157.9, 158.0' - Bedding plane (6), <10 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			4	158.15, 158.3' - Bedding plane (2), smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			0	160.35' - Fracture, 20 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	160.65' - Bedding plane, horizontal, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	160.85' - Fracture, 65 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	161.0' - Fracture, 15 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	161.25' - Mechanical break, 45 deg, rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	161.25-161.5' - Fracture zone, rough, undulating, multiple intersecting fractures		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	161.7' - Fracture, 15 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	161.95' - Fracture, 65 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	165.0-165.2' - Fracture zone, rough, stepped to undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	165.75-165.95' - Bedding plane, horizontal, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	165.95-166.65' - Fracture zone, smooth to rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			NR	166.85' - Fracture or mechanical break, 60 deg, rough, stepped		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
165 -122.6	165.0		5	161.25-161.5' - Fracture zone, rough, undulating, multiple intersecting fractures		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	SC-4 collected at 165.2-165.75'
	R21-NQ 5 ft 48%	12	>10	161.7' - Fracture, 15 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			3	161.95' - Fracture, 65 deg, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			3	165.0-165.2' - Fracture zone, rough, stepped to undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			3	165.75-165.95' - Bedding plane, horizontal, smooth, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			3	165.95-166.65' - Fracture zone, smooth to rough, undulating		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	
			3	166.85' - Fracture or mechanical break, 60 deg, rough, stepped		155.5-158.0' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 5/2), very fine to fine grained, weak (R2), 10-20% organic laminations on bedding plane, fractures in poorly competent seams and laminae	



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 ORIENTATION : Vertical
 WATER LEVELS : 4.41 ft bgs on 3/06/07 START : 2/15/2007 END : 2/23/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
170 -127.6	170.0		NR	166.95' - Fracture, horizontal, rough, undulating 167.1' - Fracture, vertical, rough, undulating 167.3' - Bedding plane, horizontal, smooth, undulating 170.1' - Bedding plane, horizontal, smooth, undulating, 1/2" open 170.6' - Fracture, 60 deg, rough, undulating 170.7' - Bedding plane, horizontal, rough, undulating 171.0, 171.3, 171.85' - Fractures (3), 40 deg and 30 deg, rough, undulating, <1/4" open 172.15' - Bedding plane, horizontal, rough, undulating 172.35-172.7' - Fracture zone, rough, undulating, intersecting fractures at varying angles 173.05' - Fracture, 20 deg, rough, undulating 173.15-173.3' - Fracture zone, intersecting fractures at varying angles 173.55, 173.75, 173.95, 174.3, 174.6' - Bedding plane or fracture (5), <10 deg, rough to smooth, undulating, <1/2" open 175.1' - Fracture, 70 deg, smooth, undulating 175.2, 175.5, 175.9, 176.05, 176.25, 176.35, 176.6, 176.8, 177.4, 177.65, 177.8' - Bedding plane (11), <10 deg, smooth, undulating, <1/8" open to tight		158.0-158.6' - very light gray to yellowish gray, (N8 to 5Y 8/1), moderate HCl reaction, weak to medium strong (R2 to R3), minor to trace voids, minor iron staining on surface No Recovery 158.6-160.0' Limestone 160.0-162.2' - very light gray to light brownish gray, (N7 to 5YR 6/1), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids cover 0-80% of surface, no voids at 160.4-160.65' No Recovery 162.2-165.0' Limestone 165.0-167.4' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 30-60% of surface No Recovery 167.4-170.0' Limestone 170.0-170.1' - Same as 165.0-167.4' except few voids on surface 170.1-170.6' - moderate yellowish brown, (10YR 5/4), very fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), trace laminated bedding with few infill features 170.6-174.8' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 50-80% surface, cavities and dissolution features up to 1/4" cover 20% surface from 170.9-171.8', bedding plane laminations at 178.6-178.9', contacts from very fine to medium grained lithologies at 170.1', 170.6', and 172.15-172.2' No Recovery 174.8-175.0' Limestone 175.0-177.8' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 10-30% of surface, voids up to 1/2" rare No Recovery 177.8-180.0' Limestone 180.0-181.0' - light olive gray, (5Y 6/1), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids cover 30% of surface, bedding plane laminations, trace fossils No Recovery 181.0-185.0'	R21: 7 minutes
175 -132.6	175.0	R22-NQ 5 ft 96%	38	4			R22: 8 minutes
180 -137.6	180.0	R23-NQ 5 ft 56%	22	5			R23: 8 minutes
185 -142.6	185.0	R24-NQ 5 ft 20%	7	10	180.1, 180.25, 180.6, 180.7, 180.85, 180.9' - Bedding plane (6), <10 deg, rough, undulating to stepped		Core not retained in sample barrel; NQ tooling removed to retrieve sample from core barrel 2.5' of slough or sand in borehole from apparent flow zone at 177.5'; hole cleaned out to 180.0'
							R24: 6 minutes Drill stem sand-locked at 185.0'; back hammered 3 hours to free tooling Sand flow zone likely at 180.0-183.0'
						Bottom of Boring at 185.0 ft bgs on 2/23/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 1 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
43.1	0.0	1.3	SS-1	2-2-2 (4)	Topsoil 0.0-0.3' - very dusky red, (10R 2/2), moist, 20-30% fine to coarse rootlets Poorly Graded Sand With Organics (SP) 0.3-1.3' - very light gray, (N8), moist, very loose, very fine to fine grained, trace nonplastic fines, 10% organics, decreasing with depth, silica sand		SS-1 collected at 08:45 140-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 38.1	5.0	0.9	SS-2	2-3-3 (6)	Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose, very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2' of sample		SS-2 collected at 09:07 SS-2 is wet so water level is placed at 3.0' bgs
10 33.1	10.0	1.0	SS-3	7-8-7 (15)	Poorly Graded Sand (SP) 10.0-11.0' - very pale orange, (10YR 8/2), wet, medium dense, fine silica sand, 5% nonplastic fines, trace very fine black particles		SS-3 collected at 09:14
15 28.1	15.0	0.9	SS-4	5-8-12 (20)	Silty Sand (SM) 15.0-15.9' - pale yellowish brown, (10YR 6/2), wet, medium dense, fine silica sand, 20% nonplastic fines, trace very fine black particles		SS-4 collected at 09:23
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 2 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
23.1	20.0	1.0	SS-5	11-19-24 (43)	Silty Sand (SM) 20.0-21.0' - Same as 15.0-15.9' except dense		SS-5 collected at 09:32
	21.5						
25	25.0	1.1	SS-6	20-35-50 (85)	Silty Sand (SM) 25.0-26.1' - Same as 20.0-21.0' except very dense		SS-6 collected at 09:47
18.1	26.5						
30	30.0	1.3	SS-7	23-48-50/4 (98/10")	Silty Sand (SM) 30.0-31.3' - pale yellowish orange, (10YR 6/2), wet, very dense, fine silica sand, 20% nonplastic fines, trace very fine black particles, 5% medium to coarse sand-sized concretions in the upper 0.3' of sample		SS-7 collected at 10:08
13.1	31.3						
35	35.0	1.3	SS-8	24-43-50 (93)	Silty Sand (SM) 35.0-36.3' - pale yellowish orange, (10YR 6/2), wet, very dense, fine silica sand, 20% nonplastic fines, 5-10% very fine black particles, trace medium grain-sized concretions, trace organics		SS-8 collected at 10:22
8.1	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 3 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
3.1	40.0	1.0	SS-9	30-50/6 (80/12")	| | | | |	SS-9 collected at 10:38
	41.0			Silty Sand (SM) 40.0-41.0' - pale yellowish brown, (10YR 5/4), wet, very dense, fine silica sand, 15-20% nonplastic fines, trace very fine black particles		
45 -1.9	45.0	0.9	SS-10	34-50/4.5 (84/10.5")	| | | | |	SS-10 collected at 10:57 Driller's Remark: 11:05 added 1/2 50-lb bag of QuikGel bentonite after removing sand cuttings from tub and refilling with clean water; maintained circulation since start
	45.9			Silty Sand (SM) 45.0-45.9' - Same as 40.0-41.0' except very pale orange, (10YR 5/4), wet, very dense, dark yellowish orange (10YR 6/6) mottling in upper portion of sample, sample grades to pale yellowish brown (10YR 6/2) from 45.5-46.1', fine silica sand, 15-20% nonplastic fines, trace very fine to medium black particles, trace medium sand-sized concretions, similar to above		
50 -6.9	50.0	1.2	SS-11	28-44-50 (94)	| | | | |	SS-11 collected at 11:35
	51.5			Silty Sand (SM) 50.0-51.2' - light olive gray, (5Y 5/2), wet, very dense, fine silica sand, 20-25% nonplastic fines, trace very fine black particles		
55 -11.9	55.0	1.2	SS-12	22-34-44 (78)	| | | | |	SS-12 collected at 13:54
	56.5			Silty Sand (SM) 55.0-56.2' - Same as 50.0-51.2' except trace coarse sand-sized concretions over first 0.1' (slough)		
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 4 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				6"-6"-6" (N)			
-16.9	60.0	1.2	SS-13	25-43-50 (93)	Silty Sand (SM) 60.0-61.2' - Same as 55.0-56.2' except no concretions and color changes from yellowish gray (5Y 7/2) in upper 0.25' to light olive gray (5Y 5/2) from 60.25-61.2'		SS-13 collected at 14:13
	61.5						
65	65.0						
-21.9	65.9	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, fine silica sand, 15-20% nonplastic fines, trace very fine black particles		SS-14 collected at 14:39
70	70.0						
-26.9	71.0	0.9	SS-15	35-50/6 (85/12")	Silty Sand (SM) 70.0-70.9' - yellowish gray, (5Y 7/2), wet, very dense, fine silica sand, 15-20% nonplastic fines, trace very fine black particles		SS-15 collected at 15:00 Added water and 1/4 bag QuikGel bentonite
75	75.0						
-31.9	75.9	0.8	SS-16	33-50/5 (83/11")	Silty Sand (SM) 75.0-75.8' - Same as 70.0-70.9'		SS-16 collected at 15:25
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 5 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-36.9	80.0	1.4	SS-17	18-32-44 (76)		SS-17 collected at 15:50 Added 1/4 50-lb bag of QuikGel bentonite
	81.5					
85 -41.9	85.0	1.1	SS-18	15-12-12 (24)		SS-18 collected at 16:15
	86.5					
90 -46.9	90.0	1.3	SS-19	11-11-10 (21)		SS-19 collected at 16:39
	91.5					
95 -51.9	95.0	0.7	SS-20	6-7-8 (15)		SS-20 collected at 17:05
	96.5					
100						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01	SHEET 6 OF 6
SOIL BORING LOG		

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 ORIENTATION : Vertical
 WATER LEVELS : 4.5 ft bgs on 4/5/2007 START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-56.9	100.0	1.5	SS-21	10-24-49 (73)		SS-21 collected at 17:39 18:03 Driller tape measures hole Total depth at 97.0' Water level at 4.5' below ground surface 4/05/07 07:36 Water level at 3.5' bgs Grouted to surface with three 92 lb bags of Holcim brand Portland cement and two 47-lb bags of Quikrete brand Portland cement
	101.5			Bottom of Boring at 101.5 ft bgs on 4/5/2007		
105 -61.9						
110 -66.9						
115 -71.9						
120						



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
 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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
42.9	0.0	1.5	SS-1	1-2-2 (4)	<p>Poorly Graded Sand With Organics (SP) 0.0-1.0' - very light gray, (N8), moist, very loose, very fine to fine grained silica sand, trace nonplastic fines, 15% organics</p> <p>Sandy Organic Soil (OL) 1.0-1.5' - brownish black and medium brown, (5YR 3/1, 5YR 3/4), moist, soft, low plasticity, 30-40% very fine silica sand, roots</p>	<p>SS-1 collected at 10:12</p> <p>Glen Davis is cathead operator</p> <p>140-lb hammer</p> <p>24" split spoon (SS)</p> <p>5.0' sections of NW rod</p> <p>4.75" tricone roller drill bit</p> <p>1/2 50-lb bag QuikGel bentonite added to mud vat</p>	
5 37.9	5.0	0.9	SS-2	3-6-8 (14)	<p>Clayey Sand (SC) 5.0-5.5' - yellowish gray, (5Y 7/2), wet, medium dense, no HCl reaction, very fine to fine silica sand, 30% low plastic fines, 10-15% rootlets</p> <p>Poorly Graded Sand (SP) 5.5-5.9' - very pale orange, (6YR 8/2), wet, medium dense, fine silica sand, trace nonplastic fines</p>	SS-2 collected at 10:39	
10 32.9	10.0	1.3	SS-3	6-7-9 (16)	<p>Silty Sand (SM) 10.0-11.3' - light olive gray, (5Y 6/1), wet, medium dense, fine silica sand, 30-35% nonplastic fines, trace very fine black particles</p>	SS-3 collected at 10:46	
15 27.9	15.0	1.1	SS-4	8-10-13 (23)	<p>Silty Sand (SM) 15.0-16.1' - Same as 10.0-11.3' except very pale orange, (10YR 8/2), 25% nonplastic fines</p>	SS-4 collected at 10:52	
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01A	SHEET 2 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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
22.9	20.0	1.1	SS-5	16-22-31 (53)	Silty Sand (SM) 20.0-21.1' - Same as 15.0-16.1' except very dense, slight hue change at bottom 4" toward pale yellowish brown (10YR 6/2), 20-25% nonplastic fines		SS-5 collected at 11:00
	21.5						
25	25.0	1.2	SS-6	20-38-55 (93)	Silty Sand (SM) 25.0-26.2' - Same as 15.0-16.1' except very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), 20% high plasticity fines		SS-6 collected at 11:07
17.9	26.5						
30	30.0	1.2	SS-7	21-31-41 (72)	Silty Sand (SM) 30.0-31.2' - Same as 25.0-26.2' except trace very fine sand-sized pale yellowish orange (10YR 8/6) particles, trace coarse sand-sized concretions		SS-7 collected at 11:17
12.9	31.5						
35	35.0	1.5	SS-8	12-18-20 (38)	Silty Sand (SM) 35.0-36.5' - pale yellowish brown, (10YR 6/2), wet, dense, fine silica sand, 30-35% nonplastic fines, black (N1) mottling of sands in a 1/4" thick seam at 35.75', similar to above (30.0-31.2')		SS-8 collected at 11:26
7.9	36.5						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'
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01A	SHEET 3 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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
2.9	40.0	1.2	SS-9	16-21-19 (40)	Silty Sand (SM) 40.0-41.2' - Same as 35.0-36.5' except random mottling of a grayish black to black sand in 1/8"-1/4" seams		SS-9 collected at 13:24
	41.5						
45	45.0	1.2	SS-10	15-18-19 (37)	Silty Sand (SM) 45.0-46.2' - pale yellowish brown, (10YR 6/2), wet, dense, fine silica sand, 30% low plasticity fines, no mottling, sample relatively homogenous		SS-10 collected at 13:36 Driller's Remark: Change out rope on hammer after noticing a weakened/frayed zone in it
-2.1	46.5						
50	50.0	1.5	SS-11	5-6-9 (15)	Fat Clay (CH) 50.0-51.5' - predominantly dusky yellow green, (5GY 5/2), moist, stiff, high plasticity, no dilatancy, mottled with dusky blue and very pale orange (5PB 3/2, 10YR 8/2), various clasts throughout sample including: trace flat, rounded coarse sand to fine gravel-sized clasts, 5% concretions near bottom of sample, trace medium sand-sized angular shaped black particles, trace rounded clasts to 1/8", low to mild HCl reaction on very pale orange clasts		SS-11 collected at 14:00
-7.1	51.5						
55	55.0	1.5	SS-12	4-5-5 (10)	Sandy Fat Clay (CH) 55.0-56.5' - predominantly yellowish gray, (5Y 7/2), moist, stiff, high plasticity, no dilatancy, mottled with dark gray and grayish green (N3 and 10GY 5/2), 25-30% very fine silica sand in irregular lenses, trace to 5% fine carbonate sand, mild HCl reaction in carbonate particles		SS-12 collected at 14:22
-12.1	56.5						
60							



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
 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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
-17.1	60.0	1.5	SS-13	3-5-5 (10)	Fat Clay With Sand (CH) 60.0-61.5' - Same as 55.0-56.5' except no dark gray mottling, 10% very fine silica sand and 10-15% medium sand-sized very pale orange (10YR 8/2) carbonate particles throughout, mild HCl reaction in carbonates		SS-13 collected at 14:53
65	61.5						
-22.1	65.0	1.5	SS-14	3-5-7 (12)	Fat Clay (CH) 65.0-66.5' - grayish green, (10GY 5/2), moist, stiff, high plasticity, no dilatancy, no HCl reaction, mottled with pale yellowish green (10GY 7/2) throughout, 1/2"-3/4" pocket of a white fat clay with 5-10% fine to medium sand-sized particles		SS-14 collected at 15:25 Driller's Remark: Will switch to a 3-7/8" drag bit to help drilling rate through clay Driller's Remark: NW rod (5 sections)
70	66.5						
-27.1	70.0	1.5	SS-15	5-8-10 (18)	Fat Clay (CH) 70.0-71.5' - pale blue, (5B 6/2), moist, very stiff, high plasticity, no dilatancy, no HCl reaction, trace mottling with yellowish gray (5Y 8/1), trace yellowish gray medium sand-sized particles, fine gravel-sized pyrite at 70.2', silty sand (SM) seam in bottom 1-3/16" of sample		SS-15 collected at 16:10
75	71.5						
-32.1	75.0	1.4	SS-16	19-21-23 (44)	Silty Sand (SM) 75.0-76.4' - pale yellowish brown, (10YR 6/2), wet, dense, no HCl reaction, fine silica sand, 20-30% nonplastic fines, trace very fine sand-sized black particles		SS-16 collected at 16:37
80	76.5						



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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
-37.1	80.0	1.2	SS-17	24-41-50 (91)	Silty Sand (SM) 80.0-81.2' - medium dark gray, (N4), wet, very dense, fine silica sands, trace very fine black particles, 20% nonplastic fines, first 4-13/16" of sample is irregularly bedded silty sand (SM) from 75.0-76.4' and the remaining 9-5/8" sand is as described above	SS-17 collected at 17:01	
	81.5						
85	85.0	1.2	SS-18	26-48-50/5.5 (98/11.5")	Silty Sand (SM) 85.0-86.2' - pale yellowish brown, (10YR 6/2), wet, very dense, medium dark gray (N4) staining, fine silica sand, 25-30% nonplastic fines, trace medium sand-sized concretions	SS-18 collected at 17:28 Driller's Remark: 04/05/07 Stop drilling for the day at 17:34	
-42.1	86.5						
90	90.0	1.5	SS-19	14-9-9 (18)	Silty Sand (SM) 90.0-91.5' - pale yellowish brown, (10YR 6/2), wet, medium dense, fine silica sand, 30-40% low plastic fines including 7-10% very fine sand-sized black particles, trace medium dark gray (N4) staining, trace angular fine gravel-sized pyrite at top of sample (possibly slough)	SS-19 taken at 09:24 Driller's Remark: Glen Davis is cathead operator on 04/06/07 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 surface 08:50 pump not circulating (Rods/pump?) Clogged with sand	
-47.1	91.5						
95	95.0	1.5	SS-20	15-8-7 (15)	Silty Sand (SM) 95.0-96.5' - pale yellowish brown, (10YR 6/2), wet, medium dense, fine silica sand, 25% low plastic fines, trace very fine sand-sized black particles	Rods broke out, cleared, re-assembled Mud vat mixed 1/2 bag bentonite for drilling	
-52.1	96.5						
						Driller's Remark: 09:35 sand clogs rods again during installation into borehole	
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01A	SHEET 6 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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 4/6/07 START : 4/5/2007 END : 4/6/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-57.1	100.0	1.2	SS-21	3-4-3 (7)		SS-21 collected at 10:46 Driller's Remark: Circulation has been maintained at all times during drilling, No casing was installed 10:46 End of drilling for GSC-01A (20.0' offset for sand delineation from GSC-01)
	101.5					
105 -62.1						
110 -67.1						
115 -72.1						
120						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-01B	SHEET 1 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
 WATER LEVELS : 3.0 ft bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
42.8	0.0	1.3	SS-1	1-2-2 (4)	Poorly Graded Sand (SP) 0.0-1.3' - very light gray, (N8), moist, very loose, very fine to fine silica sand, 5% nonplastic fines, trace very fine sand-sized black particles, trace organics and brown mottling	SS-1 taken at 15:26 24" split spoon (SS) 50-lb bags of QuikGel brand bentonite Added 1/4 bag bentonite to full mud vat	
	1.5						
5 37.8	5.0	0.9	SS-2	7-9-8 (17)	Poorly Graded Sand (SP) 5.0-5.9' - yellowish gray, (5Y 8/1), wet, medium dense, fine grained, silica sand, trace nonplastic fines including trace sand-sized black particles	Water level at 3.0' below ground surface at 15:35 based on moist SS-1, wet SS-2 samples SS-2 taken at 15:49	
	6.5						
10 32.8	10.0	1.3	SS-3	8-11-12 (23)	Silty Sand (SM) 10.0-11.3' - very light gray to yellowish gray, (N8 to 5Y 8/1), wet, medium dense, fine grained, low plasticity, silica sand, 25-35% low plastic fines including trace very fine sand-sized black particles, trace fine gravel-sized concretions	SS-3 taken at 15:54	
	11.5						
15 27.8	15.0	1.2	SS-4	12-15-13 (28)	Silty Sand (SM) 15.0-16.2' - very light gray to yellowish gray, (N8 to 5Y 8/1), wet, medium dense, fine grained, nonplastic, silica sand, 20-25% nonplastic fines, trace very fine grain black particles	SS-4 taken at 15:59	
	16.5						
20							



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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
22.8	20.0	1.1	SS-5	12-15-14 (29)	Silty Sand (SM) 20.0-21.1' - Same as 15.0-16.2'		SS-5 taken at 16:04
	21.5						
25	25.0	1.0	SS-6	12-75-72 (147)	Silty Sand (SM) 25.0-26.0' - Same as 20.0-21.1'		
17.8	26.5						
30	30.0	1.5	SS-7	5-7-6 (13)	Fat Clay (CH) 30.0-31.5' - mixed CH materials in irregular lenses and pockets, 30.0-30.4' is grayish green (10GY 5/2), with medium gray to dark gray mottling (N3 to N4), 30.4-31.1' is very pale orange (10YR 8/2), 31.1-31.5' is grayish green (10GY 5/2) with very pale orange mottling (10YR 8/2), moist to wet (30.4-31.1'), stiff, high plasticity, no HCl reaction, trace medium sand-sized very pale orange (10YR 8/2) and dark gray (N1) clasts		SS-7 taken at 16:21
12.8	31.5						
35	35.0	0.8	SS-8	15-13-13 (26)	Clayey Limestone Gravel With Sand (GC) 35.0-35.8' - yellowish gray with light olive gray staining, (5Y 8/1 with 5Y 5/6), wet, medium dense, strong HCl reaction, angular gravel-sized limestone, 20-25% fine to coarse sand-sized, 20% medium to high plastic fines, carbonate materials		Driller's Remark: change to tricone roller bit 3-7/8" at 34.0', hit hard rock SS-8 taken at 16:44
7.8	36.5						
40							



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
 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 bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.8	40.0	0.4	SS-9	11-8-9 (17)		SS-9 taken at 16:54
	41.5					Driller's Remark: 17:02 43.5' hard drilling, loss of circulation (LOC) up to 100%
45	45.0	1.0	SS-10	7-9-8 (17)		SS-10 taken at 17:06 Installed 40.0' HW casing
-2.2	46.5					
50	50.0	1.5	SS-11	20-14-11 (25)		8:22 water level at 18.0' below ground 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 SS-11 taken at 09:42
-7.2	51.5					
55	55.0	1.2	SS-12	22-15-14 (29)		100% circulation loss; refill vat, add 1/2 bag bentonite
-12.2	56.5					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 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-CN) Refill mud vat, add 1/4 bag bentonite SS-12 taken at 13:55
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
 WATER LEVELS : 3.0 ft bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.2	60.0	1.0	SS-13	30-22-23 (45)		Driller's Remark: 14:05 switch to N-rod (5.0' sections) 2-7/8" tricone roller bit due to continued down-hole cave-in SS-13 taken at 14:32
	61.5					Switch back to NW casing advancer tricone roller drill bit, maintaining some circulation through HW set to 45.0' below ground surface
65	65.0	1.2	SS-14	19-16-10 (26)		SS-14 taken at 16:02
-22.2	66.5					Last run of 4/7/07
70	70.0	1.5	SS-15	6-7-8 (15)		08:35 water level at 3.0' below ground surface on 4/8/07
-27.2	71.5					65.0' NW installed Using NW casing advancer with wireline tricone drill bit accessory N-rod (5.0' sections) 140-lb hammer via cathead SS-15 taken at 09:02
						5.0' NW casing added to advance boring
75	75.0	1.5	SS-16	12-17-15 (32)		Driller's Remark: 09:20 he'll have to switch back to 2-7/8" tricone drag bit to get through clay - will no longer be advancing NW casing 70.0' NW currently installed Driller's Remark: 09:40 good circulation through NW casing Two irregular blows in SS-16 SPT
-32.2	76.5					SS-16 taken at 09:58
						Driller's Remark: adding another 5.0' section of NW casing, losing depth to cave-in
80						



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 EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-37.2	80.0	1.5	SS-17	4-6-11 (17)	[Symbolic Log Pattern]	SS-17 taken at 10:42
	81.5					
85 -42.2	85.0	1.5	SS-18	4-5-12 (17)	[Symbolic Log Pattern]	SS-18 taken at 11:19 Driller's Remark: 75% circulation loss at 85.0'
	86.5					
90 -47.2	90.0	1.5	SS-19	5-14-22 (36)	[Symbolic Log Pattern]	SS-19 taken at 11:27
	91.5					
95 -52.2	95.0	1.4	SS-20	5-12-15 (27)	[Symbolic Log Pattern]	SS-20 taken at 11:55
	96.5					
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 ORIENTATION : Vertical
 WATER LEVELS : 3.0 ft bgs on 03/10/07 START : 4/6/2007 END : 4/9/2007 LOGGER : T. Stewart

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-57.2	100.0	1.5	SS-21	7-8-8 (16)		SS-21 taken at 12:22 SS-21 (100.0-101.5') is the last sample for GSC-01B, end of drilling Hole abandoned on 4/9/07 with 50-55 gallons of grout mix, 12 bags of 47-lb each of Quick Portland cement Type I/II
	101.5					
105 -62.2						
110 -67.2						
115 -72.2						
120						



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 EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
40.4	0.0	1.1	SS-1	1-2-3 (5)	Topsoil (OL) 0.0-0.3' - brownish black, (5YR 2/1), moist, very soft, 60% organic no fines, <40% roots/vegetative detritus Poorly Graded Sand With Some Limestone 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 35.4	5.0	0.4	SS-2	5-18-10 (28)	Sandy Clay And Organic Wood Debris (SC) 5.0-5.4' - light gray to yellowish gray, (N/7, 5Y8/1), moist, very stiff, medium plasticity, no to mild HCl reaction, <30% very fine to medium grained carbonate sands, 50% of sample is wood debris		Driller's Remark: Wood from 5.0-8.5' below surface, several scoops of wood chips removed from mud pit Driller's Remark: Smooth, easy drilling, light chatter at 7.0' and 9.5'
10 30.4	10.0 10.3	0.3	SS-3	50/4 (50/4")	Silt (ML) 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 <1/4" diameter, carbonate materials		
15 25.4	15.0	0.5	SS-4	13-3-8 (11)	Silt (ML) 15.0-15.5' - grayish yellow with moderate yellow lenses, (5Y 8/4 with 5Y 7/6), moist to wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% very fine to medium sand, carbonate materials		
20							



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 EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	20.4	RECOVERY (ft)	#TYPE				
		20.4	0.2					SS-5
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, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 30-35% fine to coarse sand-sized limestone fragments, lenses <1/4" thick, carbonate materials		
25 15.4	25.0	1.2	SS-6	35-40-35 (75)	Sandy Silt With Limestone Lenses (ML) 25.0-26.2' - grayish yellow, (5Y 8/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 25% fine to medium sand, <30% limestone lenses <1/4" thick, carbonate materials		
30 10.4	30.0	1.0	SS-7	15-15-40 (55)	Silt With Limestone Lenses (ML) 30.0-31.0' - Same as 25.0-26.2' except dark yellowish orange, (10YR 6/6)		Stop drilling for the day at 17:30, resume drilling 5/16/07 08:00, water level at 1.4' below ground surface
35 5.4	35.0	0.5	SS-8	35-50/2 (85/8")	Silty Sand (SM) 35.0-35.5' - yellowish gray, (5Y 7/2), moist, very dense, moderate HCl reaction, fine to coarse sand, 30% nonplastic fines, carbonate materials		Driller's Remark: Moderate to light chatter from 35.0-39.0'
40	35.7						Driller's Remark: 39.0-40.0' rapid smooth drilling



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 ORIENTATION : Vertical
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
		50/3.5 (50/3.5")					
0.4	40.0	0.3	SS-9	50/3.5 (50/3.5")	Silty Sand And Limestone Fragments (SM) 40.0-40.3' - Same as 35.0-35.5' except 35-40% fine gravel-sized limestone fragments	|||||	Driller's Remark: Smooth drilling with moderate to fast movement, intermittent light chatter
45 -4.6	45.0	1.3	SS-10	18-20-35 (55)	Sandy Silt And Limestone Lenses/fragments (ML) 45.0-46.3' - Same as 40.0-40.3' except 25% nonplastic fines, 35% fine gravel-sized limestone fragments in lenses	|||||	
50 -9.6	50.0	0.8	SS-11	50-50/5 (100/11")	Limestone And Silty Sand 50.0-50.8' - Same as 45.0-46.3' except 60% fine to coarse gravel-sized limestone fragments, 30-35% fine to coarse sand, 15-20% of nonplastic fines Begin Rock Coring at 51.0 ft bgs See the next sheet for the rock core log	|||||	
55 -14.6	50.9						
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
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
51.0	R1-NQ 5 ft 89%	58	2	51.2' - Bedding plane, horizontal, smooth, undulating, open <1/4"		Limestone 51.0-55.45' - pale yellow brown, (10YR 6/2), fine to medium grained, moderate to high HCl reaction, extremely weak to weak (R0 to R2), voids <1/16" diameter over 50% of surface, trace fossil molds <1/2" diameter, trace cavities <1/2" diameter, trace crystallized limestone infill No Recovery 55.45-56.0'	Establish rock contact at 51.0' below ground surface, set HW casing to 51.0' below ground surface Begin rock coring using NQ wireline tooling from 51.0' below ground surface R1:2 minutes
			0	51.7' - Fracture or mechanical break, 30 deg, rough, undulating, open <1/4"			
			6	52.35' - Mechanical break			
			3	53.05' - Fracture or mechanical break, 30 deg, rough, undulating, open <1/4"			
			1	53.25, 53.6, 53.85' - Bedding plane or mechanical break (3), horizontal, smooth, undulating, open <1/4"-1/2"			
55 -14.6			NR	53.5' - Mechanical break			
				53.9' - Fracture or mechanical break, 20 deg and 40 deg, rough, undulating, open <1/4"		No Recovery 56.0-61.0' Limestone 56.0-61.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, high HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 40-50% of surface, trace fossil molds	R2:3 minutes
56.0	R2-NQ 5 ft 100%	92	2	54.3' - Bedding plane or mechanical break, horizontal, smooth, undulating, open <1/4"-1/2"			
			2	54.5' - Fracture or mechanical break, 20 deg and 40 deg, rough, undulating, open <1/4"			
			1	54.6, 54.7' - Mechanical break (2)			
			1	54.75' - Fracture or mechanical break, 20 deg and 40 deg, rough, undulating, open <1/4"			
			1	55.15, 55.4' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, open <1/4"-1/2"			
60 -19.6				56.4, 56.8, 57.1, 57.7, 58.7, 59.2' - Bedding plane or mechanical break (6), <10 deg, rough, undulating, open <1/4"			
				60.1' - Fracture or mechanical break, 65 deg, smooth, undulating, tight to open <1/4"		61.0-64.5' - pale yellowish brown to light gray, (10YR 6/2 to N7), very fine to medium grained, strong HCl reaction, 61.0-62.0' and 62.45-63.0' very weak to weak (R1 to R2) rock, 62.0-62.45' extremely weak (R0) rock, 63.0-64.5' medium strong to strong (R3 to R4) rock, voids (<1/16") over 30-50% surface except trace voids from 62.0-62.45', trace fossil molds <1/2" diameter, trace cavities <1/2" diameter from 61.0-62.0', trace organics No Recovery 64.5-66.0'	R3:3 minutes
61.0	R3-NQ 5 ft 70%	44	3	61.5' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open <1/2"-1/4"			
			2	61.7' - Mechanical break or fractures, 20 deg, rough, undulating, tight to open <1/2"			
			2	62.0' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open <1/2"-1/4"			
			NR	62.7' - Mechanical break or fractures, 20 deg, rough, undulating, tight to open <1/2"			
			NR	62.95' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open <1/2"-1/4"			
65 -24.6				63.15' - Mechanical break or fractures, 50 deg, rough, undulating, tight to open <1/2"		Limestone 66.0-70.9' - pale yellow brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), except 67.5-67.9' that is extremely weak (R0) to very weak (R1) rock, voids (<1/16") over 30-50% of surface, 10-20% fossil molds <1/4" diameter, trace cavities <3/4" by 1/2", trace organics	R4:5 minutes
	R4-NQ 5 ft 98%	88	1	63.35' - Mechanical break or fractures, 10 deg, rough, undulating, tight to open <1/2"			
			3	63.5' - Mechanical break			
			0	64.25' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open <1/2"-1/4"			
			1	64.4' - Mechanical break or fractures, 50 deg, rough, undulating, tight to open <1/2"			
			2	66.5, 67.45' - Fractures or mechanical break (2), 20 deg and 30 deg, rough, undulating, open <1/4"			
70 -29.6				67.7, 68.85' - Bedding plane or mechanical break (2), <10 deg, rough, undulating, open <1/2"			
				71.0			



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

WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
75 -34.6	R5-NQ 5 ft 100%	84	NR 2	69.1, 70.1, 70.5' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, undulating, open <1/4"		No Recovery 70.9-71.0' Limestone 71.0-76.0' - pale yellowish brown to light gray, (10YR 6/2 to N7), very fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), grain size increases with depth, except 73.5-74.7' extremely weak to very weak (R0 to R1) rock, voids (<1/16") over <20-50% of surface-variable, no cavities, few fossil molds <1/4" diameter, stong rock zone from 72.4-72.85'	R5:4 minutes	
76.0	0	71.5, 71.55, 73.6, 73.65, 73.9, 74.25' - Bedding plane or mechanical break (6), <10 deg, smooth to rough, undulating, tight to open <1/2"	76.0-79.65' - pale yellowish brown to light gray, (10YR 6/2 to N7), very fine to medium grained, strong HCl reaction, 76.0-77.8' and 78.7-78.9' very weak (R1) to weak (R2) rock, 77.8-78.7' and 78.9-79.65' medium strong (R3) to strong (R4) rock, voids (<1/16") over 20-30% of surface, trace fossil molds <1/4" diameter, about 10-20% cavities <1/2" diameter especially from 77.8-78.7'					
80 -39.6	R6-NQ 5 ft 73%	18		3		74.65' - Fracture or mechanical break, 30 deg, rough, undulating, open <1/4"	No Recovery 79.65-81.0'	R6:8 minutes
81.0	>10	75.7, 75.8' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, undulating, open <1/2"	Limestone 81.0-85.9' - pale yellowish brown to light olive gray, (10YR 6/2 to 5YR 5/2), very fine to medium grained, moderate to strong HCl reaction, weak to strong (R2 to R4), voids (<1/16") over 40-60% of surface, moderately fossiliferous, many fossil molds/casts up to 2" diameter, trace cavities <1" diameter possible void space/cavity in fracture zone at 81.0-81.5', crystal infill, trace over surface except 82.0-82.5' over 50% of surface, trace organic laminations especially at 81.8'					
85 -44.6	R7-NQ 5 ft 98%	60		>10		76.1, 76.3' - Fractures or mechanical break (2), <10 deg, rough, undulating, tight to open <3/4"			No Recovery 85.9-86.0' Limestone 86.0-89.5' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 20-40% of surface, highly fossiliferous with fossil molds/casts <1/2" diameter, trace cavities <1" diameter
86.0	3	76.9' - Fracture or mechanical break, 40 deg, rough, undulating, open <1/2"		No Recovery 89.5-91.0'				
90 -49.6	R8-NQ 5 ft 70%	56	NR			77.3' - Fracture or mechanical break, <10 deg, rough, undulating, tight to open <3/4"	Driller's Remark: Light chatter (89.5-91.0') R8:7 minutes	
91.0	0	77.5-78.8' - Fracture zone, rough, undulating, gravel-sized fragment, <2" diameter						
	1	79.0, 79.15' - Fractures (2), rough, undulating, intersecting fractures at 90, 60, and 80 degrees, tight to open <1/4"						
	0	79.25' - Fracture or mechanical break, <10 deg, rough, undulating, tight to open <3/4"						
	>10	81.0-81.6' - Fracture zone, smooth to rough, undulating, gravel-sized fragments <1"-1/2" diameter						
	NR	81.6' - Bedding plane, <10 deg, smooth, undulating, unknown open thickness, adjacent to fragments above						
	2	82.1, 82.3, 82.4' - Fractures or mechanical break (3), rough, undulating, 3 intersecting fractures at 60, 60, and 50 degrees respectively, open <3/4"						
	1	83.5' - Mechanical break						
	>10	85.0-85.2' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter						
	NR	85.5, 85.6' - Fractures (2), 30 deg and 40 deg, rough, undulating, 2 intersecting fractures, tight to open <3/4"						
	2	86.7, 86.8' - Fractures or mechanical break (2), 80 deg and 40 deg, rough, undulating, 2 intersecting fractures or mechanical breaks, tight to open <1/2"						
	0	87.25' - Fracture or mechanical break, 50 deg, rough, undulating, tight						
	>10	87.45, 87.9, 88.2, 88.45, 88.65' - Mechanical break (5)						
	NR	89.0-89.5' - Fracture zone, rough, undulating, gravel-sized fragments <1"-1/2" diameter						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-02	SHEET 6 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
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
95 -54.6	R9-NQ 5 ft 90%	64	0		Limestone 91.0-95.5' - pale yellowish brown to moderate yellowish brown transitioning to yellowish gray beyond 94.0'; (10YR 6/2 to 10YR 5/4 to 5Y 8/1), fine to very fine grained, grain size fining with depth, weak to medium strong (R2 to R3) rock to 94.3', 93.46-93.05' and 94.3-94.7' extremely weak (R0) rock with red organic soils, 94.7-95.5' very weak to weak (R0 to R2) rock, 93.45-93.85' fracture zone with interbedded organic silts up to 3/4" in the beds, 93.45-93.85' fracture zone with poorly competent silts to no competent elastic silts (MH) up to 2" thick as beds, 91.0-93.45' voids (<1/16") over 50-60% of surface, highly fossiliferous with molds/casts <1" diameter, few cavities <3/4" diameter, moderate to strong HCl reaction, 93.45-93.85' fragments with organics interbedded, 93.85-94.3' no voids, no cavities, very fine grained medium strong (R3) rock; 94.3-94.7' fragments with silt/elastic silt interbedded; 94.7-95.5' voids (<1/16") over 10-50% of surface, few cavities <1/4" diameter, poorly fossiliferous No Recovery 95.5-96.0' Limestone 96.0-101.0' - pale yellowish brown to yellowish brown, (10YR 6/2 to 5YR 5/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over <20-50% of surface (variable), trace organics, trace infill, trace laminated bedding, moderately fossiliferous with fossil molds/casts <1" diameter, trace cavities 101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 30% of surface, moderately fossiliferous with molds/casts <1/2" diameter, trace organics No Recovery 105.95-106.0' Limestone 106.0-111.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over <20% of surface, moderately fossiliferous with molds/casts <1/2" diameter	R9:8 minutes	
			2	92.1, 91.65, 93.45' - Bedding plane or mechanical break (3), <10 deg, rough, undulating, open <1/4"			
			>10	93.45-93.85' - Fracture zone, rough, undulating, organic zone, gravel-sized fragments <1" diameter			
			>10	94.1-94.7' - Fracture zone, smooth to rough, undulating, silt horizon, gravel-sized fragments <2" diameter			
			0				
100 -59.6	R10-NQ 5 ft 100%	92	0		97.05' - Mechanical break or bedding plane, horizontal and 70 deg, rough, undulating, tight 99.0, 99.15' - Fractures (2), undulating, intersecting fractures, tight to open <1/4" 99.5' - Mechanical break 99.7' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 100.85' - Mechanical break or bedding plane, horizontal, smooth, undulating, open <1/4" 101.0, 101.1, 100.3, 101.6, 102.0' - Bedding plane or mechanical break (5), smooth, undulating, open <1/4" 103.0' - Fractures (>5), smooth, undulating, 5 plus intersecting fractures from one main fracture, 70 degrees with 0 degree minor, open <1/4" 103.6, 105.75' - Bedding plane or mechanical break (2), smooth, undulating, open <1/4" 106.3, 106.6, 106.9, 107.1, 107.5, 107.9, 108.25, 108.7, 109.05' - Bedding plane or mechanical break (9), 40 deg, smooth to rough, undulating, tight to open <1/4" 109.5' - Mechanical break	R10:3 minutes	
			1				
			0				
			3				
			1				
105 -64.6	R11-NQ 5 ft 99%	73	5		101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 30% of surface, moderately fossiliferous with molds/casts <1/2" diameter, trace organics No Recovery 105.95-106.0' Limestone 106.0-111.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over <20% of surface, moderately fossiliferous with molds/casts <1/2" diameter	R11:5 minutes	
			0				
			10				
			0				
			1				
110 -69.6	R12-NQ 5 ft 100%	70	NR		106.0-111.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over <20% of surface, moderately fossiliferous with molds/casts <1/2" diameter	R12:4 minutes	
			3				
			3				
			2				
			2				
			4				



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 ORIENTATION : Vertical
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
115 -74.6	R13-NQ 5 ft 98%	80	>10 0 1 2 0	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" 111.0-111.8' - Bedding plane (>10), horizontal, smooth, undulating, tight to open <1/4" 113.0' - Bedding plane, horizontal, smooth, undulating, tight to open <1/4" 113.5' - Mechanical break 114.3' - Fracture or mechanical break, 80 deg, 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, poorly fossiliferous, laminated bedding from 111.0-111.3'	R13:7 minutes
120 -79.6	R14-NQ 5 ft 99%	70	NR 2 4 3 6 1	116.4, 116.8, 117.55, 117.65, 117.7, 117.8, 118.2' - Bedding plane or mechanical break (7), rough, undulating, tight to open <1/4" 118.6' - Mechanical break 118.85, 119.1, 119.2, 119.3, 119.4, 119.5, 119.6' - Bedding plane or mechanical break (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 115.9-116.0' Limestone 116.0-120.95' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, weak (R2), voids (<1/16") over 30% of surface increasing with depth, grain size and recrystallized texture increasing with depth, moderately fossiliferous with molds/casts <1/2" diameter, trace laminated organics, 10-20% cavities <1/2" diameter	R14:3 minutes
125 -84.6	R15-NQ 5 ft 97%	65	NR 0 3 0 4 2	122.15, 122.25, 122.6' - Bedding plane or mechanical break (3), smooth to rough, undulating, tight to open <1/2" 123.1, 123.6, 123.8' - Mechanical break 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"		No Recovery 120.95-121.0' 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 increasing with depth, highly fossiliferous from 122.8-125.7' with molds/casts and shells <1" diameter otherwise moderately fossiliferous, voids (<1/16") variable over surface from <10-20%, trace cavities <1/2" diameter	R15:3 minutes
130 -89.6	R16-NQ 5 ft 100%	100	NR 0 0 0	127.3, 128.5, 129.6, 130.8' - Mechanical break (4)		No Recovery 125.85-126.0' Limestone 126.0-131.0' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), very fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 30-50% of surface, few cavities <1" diameter, moderately fossiliferous with molds/casts <3/4" in diameter	R16:3 minutes



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
 WATER LEVELS : 1.4 ft bgs on 5/16/07 START : 5/15/2007 END : 5/17/2007 LOGGER : R. Bitely, D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
135 -94.6	R17-NQ 5 ft 100%	66	3	131.5, 131.7, 131.9, 132.1' - Bedding plane or mechanical break (4), <10 deg and horizontal, smooth to rough, undulating, tight to open <1/4"		|	Limestone 131.0-136.0' - yellowish gray to medium light gray, (5Y 7/2 to N6), very fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), rock strength increasing with depth, voids <1/16" over 0-30% of surface, variable, <20% of core with laminated bedding, poorly fossiliferous with few fossil molds/casts <1/2" diameter, trace cavities <1/4" diameter	R17:4 minutes
			1					
			1	133.5' - Mechanical break				
			5	134.0, 134.25, 134.3, 134.4, 134.45, 135.05' - Bedding plane or mechanical break (6), <10 deg and horizontal, smooth to rough, undulating, tight to open <1/4"				
			1					
140 -99.6	R18-NQ 5 ft 93%	44	2	136.3, 136.45, 137.1, 137.35, 138.1' - Bedding plane or mechanical break (5), <10 deg, smooth to rough, undulating, tight to open <1/4"		|	136.0-140.65' - pale yellowish brown to yellowish gray, (10YR 6/2, 5Y 7/2), very fine to medium grained, strong HCl reaction, very weak (R1) to weak (R2) rock from 136.0-138.6', extremely weak to very weak (R0 to R1) rock from 138.6-139.5', weak to strong (R3 to R4) rock from 139.5-140.65', voids <1/16" over <20% of surface to 138.6', trace voids 138.6-140.65', moderately fossiliferous with fossil molds/casts <1/2" diameter, trace infill of cavities 136.0-138.6', many cavities up to 2" diameter some with infill No Recovery 140.65-141.0'	R18:4 minutes
			2					
			3	138.5' - Mechanical break				
			>10	138.6, 138.95, 139.1, 139.3' - Bedding plane or mechanical break (4), <10 deg, smooth to rough, undulating, tight to open <1/4"				
			1					
145 -104.6	R19-NQ 5 ft 94%	62	4	141.1' - Fracture or mechanical break, vertical and 0-3 deg, rough, undulating, intersecting fractures, tight to open <1/4"		|	Limestone 141.0-145.7' - pale yellowish brown to yellowish gray, (10YR 6/2, 5Y 7/2), very fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), voids <1/16" over <10-30% of surface, cavities 2" diameter over 20-40% of surface, few cavities with infill and subhedral crystal faces, highly fossiliferous with fossil molds/casts to 1" diameter, trace laminated bedding especially 144.45-144.7' No Recovery 145.7-146.0'	R19:5 minutes
			>10	141.8' - Bedding plane, <10 deg, rough, undulating, tight to open <1/4"				
			>10	142.3, 142.45, 142.55' - Fracture or mechanical break (3), <10 deg and 70 deg, rough, undulating, variable orientation, open <1/2"				
			2	142.9-143.2' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter				
			0	143.25' - Bedding plane or mechanical break, <10 deg and 10 deg, rough, undulating, open <1/2"				
			NR					
			NR					
150 -109.6	R20-NQ 5 ft 100%	92	3	143.7-143.9' - Fracture zone, gravel-sized fragments <1" diameter		|	146.0-151.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over <10% of surface, few fossils <1/2" diameter, laminated bedding over <15% of surface, trace infill	Drilling completed 5/17/07 12:30
			3	143.9, 144.5, 144.7' - Bedding plane or mechanical break (3), <10 deg and 10 deg, rough, undulating, open <1/2"				
			0	146.35, 146.5, 146.55, 147.2, 147.3, 147.7' - Bedding plane or mechanical break (6), <10 deg, smooth to rough, undulating, tight to open <1/2"				
			0	148.5' - Mechanical break				
			1	150.25' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, tight to open <1/2"				
						Bottom of Boring at 151.0 ft bgs on 5/17/2007		



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

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
40.5	0.0	0.4	SS-1	0-1-1 (2)	Topsoil (OL) 0.0-0.1' - brownish black, (5YR 2/1), wet, very soft, 60% organic nonplastic fines, 40% roots/vegetative 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		SS-1: first 6" = weight of hammer
5 35.5	1.5						
	5.0	1.0	SS-2	2-5-5 (10)	Poorly Graded Sand (SP) 5.0-6.0' - yellowish gray grades to pale yellowish brown, (5Y 8/1 to 10YR 6/2), wet, very fine to fine grained, color grades at 5.6', silica sand with trace nonplastic fines increasing to 30% high plastic fines in brown material		
10 30.5	6.5						
	10.0	1.3	SS-3	0-6-7 (13)	Silty Sand (SM) 10.0-11.8' - grades from grayish orange (10.0-10.5') to pale yellowish brown (10.5-10.8') to very pale orange (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 (orangish red) from 10.0-10.8', silica sand, 30% nonplastic fines		SS-3: first 6" = weight of hammer
15 25.5	11.5						
	15.0	1.3	SS-4	4-6-6 (12)	Silty Sand (SM) 15.0-16.0' - pale yellowish brown, (10YR 6/2), wet, medium dense, very fine to fine grained, silica sand with 20% nonplastic fines Sandy Fat Clay (CH) 16.0-16.25' - pale yellowish brown, (10YR 6/2), wet, stiff, medium plasticity, no to slow dilatancy, 30-35% very fine silica sand		
20	16.5						



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
20.5	20.0	1.3	SS-5	0-2-3 (5)	Fat Clay (CH) 20.0-20.45' - wet, stiff, no dilatancy, pale blue from 20.0-20.2', light olive gray from 20.2-20.45', (5G 6/2, 5Y 6/1), high plasticity fines, mild HCl reaction possibly from interbedded silt, one limestone fragment or concretion, no HCl 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'		SS-5: first 6" = weight of hammer
25	21.5						
15.5	25.0	1.5	SS-6	2-5-13 (18)	Silt (ML) 25.0-26.5' - grayish yellow, (5Y 8/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, coarse sand to fine gravel-sized limestone fragments from 26.2-26.5', carbonate materials		
30	26.5						
10.5	30.0	1.0	SS-7	5-12-13 (25)	Silty Sand (SM) 30.0-31.0' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist to wet, medium dense, mild HCl reaction, fine to coarse grained sand-sized, 20-25% nonplastic fines, fine gravel-sized limestone fragments, carbonate materials		
35	31.5						
5.5	35.0	1.0	SS-8	19-50/6 (69/12")	Silty Sand And Limestone Fragments (SM) 35.0-36.0' - light olive gray, (5Y 5/2), wet, very dense, 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		
40	36.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
0.5	40.0	0.7	SS-9	16-50/4 (66/10")	Silty Sand And Limestone Fragments (SM) 40.0-40.7' - yellowish gray, (5Y 7/2), wet, very dense, fine to coarse sand-sized, 35% low plastic fines, 40% of sample is limestone fragments from 40.0-40.2', mild HCl reaction from 40.2-40.7'		
	40.8						
45	45.0	0.2	SS-10	50/2.5 (50/2.5")	Limestone Fragments 45.0-45.2' - yellowish gray, (5Y 7/2), mild HCl reaction, coarse sand to fine gravel-sized material		
-4.5	48.2						
50	50.0	1.4	SS-11	0-3-2 (5)	Silty Sand (SM) 50.0-51.4' - yellowish gray, (5Y 7/2), wet, loose, fine to coarse grained, mild HCl reaction, 30% nonplastic fines, all carbonate		SS-11: first 6" = weight of hammer
-9.5	51.5						
55	55.0	0.3	SS-12	50/4 (50/4")	Limestone Fragments 55.0-55.3' - yellowish gray, (5Y 7/2), mild HCl reaction, coarse sand to fine to coarse gravel-sized fragments		
-14.5	55.3						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-03	SHEET 4 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 bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-19.5	60.0	0.8	SS-13	10-50/4 (60/10")		Water level 0.1 ft below ground surface at 0742, 08:06 Set casing-HW casing to 60.0', 09:50 HW casing down 30.0', water gushing out top of casing above ground surface-continue setting casing, 10:08 hole caving, 15:50 only get 35.0' HW casing in
	60.8			Limestone And Silt 60.0-60.8' - yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, coarse sand to fine to coarse gravel-sized limestone fragments from 60.0-60.3' and 60.75-61.0', carbonate materials		
65	65.0					Begin SS sampling again at 65.0' at 16:30
-24.5	65.3	0.3	SS-14	50/3 (50/3")		
				Limestone Fragments 65.0-65.3' - yellowish gray, (5Y 7/2), mild HCl reaction, coarse sand to fine to coarse gravel-sized fragments		
	70.0					Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log
70	70.1	0.0	SS-15	50/1 (50/1")		
-29.5				No Recovery 70.0-70.1'		
75						
-34.5						
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-03	SHEET 5 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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-29.5	70.0	67	1	70.05, 71.3, 71.8, 72.7' - Bedding plane or mechanical break (4), <10 deg, smooth to rough, undulating, open <1/2" with very fine-sized gravel infill except in fracture at 71.3'	Limestone 70.0-73.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 40% of surface, trace cavities >1/16", fossil molds No Recovery 73.6-75.0'	08:30 Install 0.0-70.0' NW casing, 10:46 water level = 0.2', Depth = 70.0', 12:00 Begin Rock Coring Driller's Remark: 72.0-72.5' and 73.0-74.5' soft R1: 6 minutes	
	2						
	1		72.4-72.5' - Mechanical break, horizontal and 80 deg, tight				
	0						
	NR						
75	75.0	14	4	75.0-75.05' - Fracture zone, angular fine gravel	Limestone 75.0-77.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), strong HCl reaction 75.0-76.1' - very fine grained, medium strong (R3), voids (<1/16") over 5% of surface 76.1-77.2' - fine grained, very weak to extremely weak (R1 to R0), voids (<1/16") over 30% of surface, cavities throughout from fossil molds up to 1/2", 10% voids have recrystallization infill No Recovery 77.2-80.0'	Driller's Remark: 76.0-77.0' void R2: 6 minutes	
-34.5	>10		75.2, 76.2, 76.3, 75.35' - Bedding plane or mechanical break (4), <10 deg, rough, undulating, 76.2' smooth and fine angular gravel in fracture (15 deg at 75.35') open <1/2"				
	>10		75.3' - Fracture or mechanical break, vertical, smooth, undulating, tight				
	NR		75.5' - Mechanical break				
	NR		76.45-77.2' - Fracture zone, smooth to rough, undulating, fine to coarse <2" diameter gravel, subangular				
80	80.0	0	>10	80.1, 80.8, 80.95' - Bedding plane (3), <10 deg, smooth to rough, undulating to stepped, open <1/2", eroded surfaces	Limestone 80.0-81.25' - moderate yellowish brown, (10YR 5/4), fine to medium grained, strong HCl reaction, strong (R4), voids (>1/16") over 40% of surface, up to 35% of core is cavity infill, trace cavities up to 1/4", fossil molds No Recovery 81.25-85.0'	Driller's Remark: 80.0-82.0' void, 82.0-83.0' soft, 83.0-84.0' rock, 84.0-85.0' void, at top of 85.0' felt rock (84.9-85.0') R3: 4 minutes	
-39.5	>10		80.25-80.4, 80.55-80.7' - Fracture zone (2), very fine to coarse angular to subangular gravel-sized limestone				
	NR		81.0-81.35' - Fracture zone, very fine to coarse angular to subangular gravel-sized limestone				
	NR						
	NR						
85	85.0	22	>10	85.0-85.05' - Fracture zone, very fine angular gravel and coarse sand-sized material and silt, possible infill	Limestone 85.0-85.6' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, extremely weak (R0), voids (<1/16") over 15-25% of surface, fine cavities up to 3/16" diameter, trace fossils up to 1/16"x1/8" 85.6-88.2' - Same as 80.0-81.25' except very weak (R1) probably due to less recrystallization in voids and more cavities up to 3/4" No Recovery 88.2-90.0'	Driller's Remark: various soft spots throughout, could be silt or soft rock R4: 6 minutes	
-44.5	>10		85.6-85.8' - Fracture zone, angular to subangular rock crush, fine to coarse gravel-sized, trace silt infill				
	>10		86.3-86.5' - Fracture zone, fine to coarse-sized subangular to subrounded fragments				
	>10		86.8, 87.0, 87.2' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, undulating, tight except open <1/2" at 87.0'				
	NR						
90	90.0						



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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-49.5	R5-NQ 5 ft 79%	46	8	87.4-87.5, 87.85-88.2' - Fracture zone (2), fine to coarse-sized subangular to subrounded fragments	Limestone 90.0-90.35' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, extremely weak (R0), voids (<1/16") over 15% of surface, 25% of rock has infilled molds or black organic material 90.35-91.3' - Same as 85.0-85.6' except 20-30% cavities up to 1-1/4" 91.3-93.95' - Same as 86.6-88.2' except cavities up to 1" No Recovery 93.95-95.0'	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", 90.3' and 91.0' have fractured gravel-sized fragments in the fractures				
1			91.35-91.45' - Fracture zone				
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				
NR							
95	R6-NQ 5 ft 26%	0	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 HCl reaction, weak (R2), voids (<1/16") over 5% of surface, trace cavities up to 1/4", light olive gray (5Y 5/2) clay/silty clay infill from 95.45-95.65' No Recovery 96.3-100.0'	Driller's Remark: 95.0-95.5' soft	
2			95.25, 95.4' - Bedding plane or mechanical break (2), <10 deg, rough, planar to undulating, tight, open <1/4" with fine gravel at 95.4'				
NR			95.6' - Bedding plane, <10 deg, smooth, planar to undulating, 1" of infill, clay and fine to very fine gravel-sized fragments 95.75, 95.9' - Bedding plane or mechanical break (2), <10 deg, rough, planar to undulating, tight 96.1-96.2' - Fracture zone				
100	R7-NQ 5 ft 10%	0	>10	100.0-100.1' - Fracture zone, trace black staining, subangular to subrounded, very fine to coarse-sized gravel	Limestone 100.0-100.5' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), very fine grained, strong HCl reaction, very weak (R1), voids (<1/16") over 40% of surface, black organic staining, cavities up to 3/16", fossil molds, trace fossils <1/8" No Recovery 100.5-105.0'	R6: 5 minutes	
-59.5			NR	100.25' - Fracture, vertical and 70 deg, rough, undulating, black staining, trace (thin layer) silt/clay infill <1/16", tight <1/16" 100.4-100.5' - Fracture zone, trace black staining, very fine to coarse-sized subangular to subrounded gravel			
105	R8-NQ 5 ft 30%	0	>10	105.1-105.4' - Fracture zone, angular to subangular, very fine to coarse gravel-sized fragments	Limestone 105.0-106.5' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), very fine to fine grained, very strong HCl reaction, extremely weak (R0), voids (<1/16") over 30-40% of surface, many recrystallized fossil casts up to 3/16", few black possibly carbon or organic material up to 1/8", fossiliferous No Recovery 106.5-110.0'	R7: 3 minutes	
-64.5			>10	105.4-106.5' - Bedding plane, smooth, undulating, open 1/4"-1", tight			
NR			NR				
110						R8: 2 minutes	



PROJECT NUMBER: 338884.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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-69.5	R9-NQ 5 ft 45%	23	2	110.05' - Bedding plane, <10 deg, smooth, planar, open <1/16"	Limestone 110.0-112.25' - grayish yellow to yellowish gray, (5Y 8/4 to 5Y7/2), very fine to fine grained, strong HCl reaction, extremely weak (R0), 111.5-111.8' silt and sand-sized material, voids (<1/16") over 50% of surface, 5+ cavities up to 9/16", few fossil molds	16:10 core barrel retriever is boud and is pulling casing with it, 16:14 got it out but have to pull out all core barrel - tip is blocked	
>10			110.2' - Bedding plane, <10 deg, smooth to rough, undulating, trace gravel fragments in fracture, open 1/2"-3/4"				
3			111.4-111.9' - Fracture zone, medium sand to fine gravel-sized fragments, trace wet silt infill				
115	R10-NQ 5 ft 0%	0	NR	112.1' - Bedding plane, <10 deg, rough, undulating, open 3/4" with rock fragments, eroded planes/surfaces	No Recovery 112.25-120.0'	R9: 3 minutes	
-74.5			NR	112.2' - Bedding plane, <10 deg, rough, undulating, open <1/4", eroded planes/surfaces			
120			NR				
120	R11-NQ 5 ft 60%	0	>10	120.1, 120.2, 120.25, 120.6, 120.4, 120.9, 121.0' - Bedding plane or mechanical break (6), <10 deg, smooth, planar to undulating, tight to 3/4" at 120.4', sand-sized material to fine gravel-sized in most fractures due to soft core, breaks easily	Limestone 120.0-123.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, very strong HCl reaction, extremely weak (R0), voids (<1/16") over 25% of surface, trace cavities up to 3/16", 5% black organic material up to 1/2", many fossil molds, moderately to highly fossiliferous	R10: 3 minutes	
-79.5			1	122.15-122.5, 122.8-123.0' - Bedding plane (2), <10 deg, smooth, planar to undulating, tight to 1/4", partings closely spaced			
>10			NR	122.5-122.8' - Fracture zone, fine angular to subangular gravel-sized fragments			
125	R12-NQ 5 ft 66%	16	>10	125.0-125.2' - Fracture zone, fine to coarse-sized gravel and coarse sand-sized fragments, angular to subrounded	Limestone 125.0-125.1' - Same as 120.0-123.0' 125.1-125.8' - light brownish gray, (5YR 6/1), fine to medium grained, strong HCl reaction, very weak (R1), voids (<1/16") over 50% of surface, cavities up to 3/8", highly fossiliferous, casts, molds, fossils 125.8-128.3' - Same as 120.0-123.0' except weak rock (R2)	Driller's Remark: 125.5-126.0' void, 127.5-128.0' soft, lost circulation at 127.0', 08:04 lots of chatter at 128.0'	
-84.5			>10	125.3, 125.7, 125.8, 126.1, 126.2' - Bedding plane (5), horizontal, smooth to rough, planar, tight			
>10			2	125.85-126.0' - Fracture zone, fine to coarse-sized gravel and coarse sand-sized fragments, angular to subrounded			
130	130.0	NR	NR	126.1, 126.2' - Bedding plane (2), horizontal, smooth to rough, planar, tight	No Recovery 128.3-130.0'	R11: 4 minutes	
			NR	126.4-126.5, 126.75-126.95' - Fracture zone, fine to coarse-sized gravel and coarse sand-sized fragments, angular to subrounded			
						R12: 5 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-03	SHEET 8 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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-89.5	R13-NQ 5 ft 64%	20	4	126.95-127.75' - Bedding plane, horizontal, smooth to rough, planar, tight, partings (127.05-127.25'), 127.35-127.75' rock is eroded and rounded openings are up to <1-1/2" from rock's outer diameter to adjacent rock	[Symbolic Log]	Limestone 130.0-133.05' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak (R1), voids (<1/16") over 40% of surface, many have infill, cavities up to 3/8", casts/molds, moderately fossiliferous 133.05-133.2' - Same as 130.0-133.05' except fine to medium grained, more fossiliferous No Recovery 133.2-135.0'	R13: 5 minutes	
>10			128.2-128.3' - Bedding plane, horizontal and 86 deg, smooth, undulating					
>10			130.0-130.1' - Bedding plane, horizontal, smooth, undulating, limestone fragments, very fine to coarse gravel-sized from 130.0-130.1'					
1			130.8, 131.0, 131.35' - Bedding plane or mechanical break (3), <10 deg, smooth, undulating, tight to open 1/4"					
135	R14-NQ 5 ft 54%	0	>10	131.46-131.75' - Bedding plane, <10 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 135.0-135.3' - yellowish gray, (5Y 8/1), fine grained, strong HCl reaction, weak (R2), voids over 5% of surface, poorly fossiliferous 135.3-135.5' - Same as 135.0-135.3' except very fine grained 135.5-135.8' - Same as 120.0-123.0' 135.8-135.95' - Same as 130.0-133.05' 135.95-136.5' - Same as 120.0-127.0' 136.5-137.7' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak (R0), 50% limestone, 50% silt with sand-sized fragments, poorly fossiliferous, voids over 0-5% of surface No Recovery 137.7-140.0'	R14: 4 minutes	
>10			131.75-131.9, 132.1-132.15, 132.6-133.05' - Fracture zone (3), angular to subangular gravel-sized limestone fragments					
>10			132.35' - Fracture, 35 deg, smooth, undulating, limestone fragments in fracture, open 1/2"-1"					
NR			135.0-135.2, 135.75-136.05' - Fracture zone (2), very fine to coarse angular to subrounded gravel sized limestone fragments and coarse sand sized material					
140	R15-NQ 5 ft 90%	38	2	135.35, 135.45, 135.55, 135.7' - Bedding plane or mechanical break (4), <10 deg, smooth to rough, undulating, tight to 1/4"	[Symbolic Log]	140.0-143.65' - grayish orange, (10YR 7/4), fine to medium grained, strong HCl reaction, weak (R2), voids (<1/16") over 5-10% of surface, fossiliferous with several molds/casts, cavities up to 1/2" 143.65-144.5' - very light gray, (N8), very fine grained, strong HCl reaction, strong (R4), moderately fossiliferous, trace small voids, few cavities, fossil molds up to 3/4" No Recovery 144.5-145.0'	R15: 6 minutes	
-94.5			>10	136.0' - Bedding plane or mechanical break, <10 deg, smooth to rough, undulating, open 1/2" with fine gravel sand in fracture				
140			8	136.05' - Fracture, 65 deg, smooth to rough, undulating, eroding fracture planes, gravel in fracture				
-99.5			>10	136.3, 136.6, 136.75' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, undulating, tight to open 1/4" except at 136.6', open 1/2" with fine gravel sand in fracture				
145			>10	136.75-138.3' - Bedding plane or mechanical break (3), <10 deg, smooth to rough, undulating, tight to open 1/4" except at 136.6', open 1/2" with fine gravel sand in fracture				
-104.5			NR	136.75-138.3' - rock has fissures/fractures vertically				
145	R16-NQ 5 ft 86%	45	>10	137.25' - Fracture, 85 deg, smooth to rough, undulating, eroding fracture planes, gravel in fracture	[Symbolic Log]	Limestone 145.0-145.2' - Same as 143.0-144.5' 145.2-147.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, weak to medium strong (R2 to R3), voids (<1/16") over 25% of surface, 60-70% recrystallized surface/voids, cavities up to 1"x3/8", trace black organic material, poorly fossiliferous	R16: 9 minutes	
150			>10	140.45, 140.5, 141.4, 141.6-141.85, 142.06, 143.5, 143.7' - Bedding plane or mechanical break (8), <10 deg, smooth, planar to undulating, tight to open 1/4"				
150			3	142.6-142.8' - Bedding plane, <10 deg, smooth, undulating, tight				
150			2	143.5-143.7, 143.8-144.2' - Fracture zone (2), 75 deg, rough, undulating, limestone fragments between the two fractures				
150			1	145.0-145.2, 146.25-146.65' - Fracture zone (2), angular to subrounded fine to coarse-sized gravel limestone fragments				
150			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-109.5	R17-NQ 5 ft 96%	60	5	145.35' - Fracture, 30-35 deg, rough, undulating, open <1/4" with limestone fragments in fracture		|	Limestone 147.0-149.0' - very fine grained, very strong (R5), black organic lineations, voids over <5% of surface, 90% recrystallized surfaces, many cavities up to 3/8" 148.0-149.3' - Same as 125.8-128.3' No Recovery 149.3-150.0' Limestone 150.0-151.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium grained, strong HCl reaction, weak (R2), highly fossiliferous with molds and casts (3/8"), voids (<1/16") over 40% of surface, strong rock (R4) from 158.5-154.8' No Recovery 154.8-155.0' Limestone 155.0-159.7' - Same as 150.0-154.8' except 155.0-156.4' strong rock (R4), 157.0-158.2' and 158.2-159.9' extremely weak rock (R0)	Driller's Remark: 153.0-153.5' void
			2	145.75, 145.85, 146.0, 148.5, 148.95, 149.0' - Bedding plane (6), <10 deg, rough, undulating to stepped, tight to 1/2", most with sand to fine gravel-sized limestone fragments in fractures				
			2	146.95, 147.05' - Fractures (2), 25 deg, rough, undulating, open <1/2" with limestone fragments in fractures				
			3	147.2, 147.5, 148.15' - Mechanical break (3)				
			1	150.3, 150.4, 150.45, 150.55, 150.85, 151.2, 151.75, 152.35, 152.55, 153.2, 154.4' - Bedding plane or mechanical break (11), <10 deg, smooth, planar to undulating, tight to <1/4"				
155 -114.5	R18-NQ 5 ft 94%	22	NR	150.75-150.9, 151.42-151.6, 154.2-154.5' - Fracture zone (3)		|	No Recovery 154.8-155.0' Limestone 155.0-159.7' - Same as 150.0-154.8' except 155.0-156.4' strong rock (R4), 157.0-158.2' and 158.2-159.9' extremely weak rock (R0)	R17: 6 minutes
			7	150.85-151.0' - Fracture zone, coarse gravel-sized				
			>10	151.1' - Fracture, 60 deg, rough, planar				
			2	152.4' - Mechanical break				
			>10	152.55, 153.0' - Bedding plane or mechanical break (2), <10 deg, smooth, planar to undulating, tight to <1/4"				
	>10	152.9-153.65' - Bedding plane, <10 deg, smooth to rough, undulating, tight						
160 -119.5	R19-NQ 5 ft 96%	58	NR	153.1' - Fracture, 75 deg, smooth, undulating, 2 bedding plane fractures perpendicular at 153.05', rough, planar open <1/4"		|	No Recovery 159.7-160.0' Limestone 160.0-164.8' - Same as 150.0-154.8' and 155.0-159.2' except medium strong to strong (R3 to R4), 160.0-160.3' and other zones of recrystallized surface voids and limestone	R18: 8 minutes
			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, 156.8, 156.85, 156.9, 156.95, 156.97, 157.05, 157.9, 159.2, 159.5' - Bedding plane or mechanical break (21), <15 deg, smooth to rough, undulating, tight to <1/4"				
			8	160.3, 161.25, 161.5, 161.65, 161.7, 161.8, 161.95, 162.05, 162.2' - Bedding plane or mechanical break (9), <10 deg, smooth to rough, undulating, open up to <1/2", most open <1/4" or tight				
			2	162.25, 162.5' - Mechanical break (2)				
			2	163.1, 163.6, 164.3, 164.5' - Bedding plane or mechanical break (4), <10 deg, smooth to rough, undulating, open up to <1/2", most open <1/4" or tight				
165 -124.5	R20-NQ 5 ft 94%	21	NR	165.0-165.1, 166.07-166.15, 166.5-166.6, 166.9-166.95' - Fracture zone (4)		|	No Recovery 164.8-165.0' Limestone 165.0-169.7' - Same as 150.0-165.0' except very fine grained and strong rock (R4) from 166.0-166.5'	R19: 11 minutes
			3	165.75, 165.85, 166.07, 166.15, 166.35, 166.5, 166.6, 166.9' - Bedding plane or mechanical break (8), <10 deg, smooth to rough, planar to undulating, few are partings, tight to open 1/2", sand to fine gravel-sized limestone fragments in fracture				
			6					
			5					
			5					
170	R20-NQ 5 ft 94%	NR				|	No Recovery 169.7-170.0'	R20: 10 minutes



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 ORIENTATION : Vertical

WATER LEVELS : 0.1 ft bgs on 6/3/07 START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-129.5	R21-NQ 5 ft 40%	>10	0	<p>166.95, 167.2, 167.4, 167.6, 167.7, 167.85, 168.1, 168.7, 168.2, 168.3, 168.5, 168.95, 169.05, 169.15, 169.17, 169.24, 169.3, 169.44' - Bedding plane or mechanical break (18), <10 deg, smooth to rough, planar to undulating, few are partings, tight to open 1/2", sand to fine gravel-sized limestone fragments in fracture</p> <p>170.0-170.6, 171.0-171.2, 171.55-172.0' - Fracture zone (3), fine to coarse angular to subangular limestone fragments, 2% sand</p> <p>170.7, 170.95, 171.2, 171.3, 171.4, 171.55' - Bedding plane or mechanical break (6), <10 deg, smooth, planar to undulating, open <1/2", sand in fractures</p>	<p>Limestone 170.0-172.0' - light olive gray, (5Y 5/2), weak (R2), voids (<1/16") over 25% of surface, few cavities up to 3/8", poorly fossiliferous, secondary infill in voids over 10-20% of surface No Recovery 172.0-175.0'</p>	R21: 7 minutes	
175 -134.5		>10					>10	171.35' - Fracture, vertical, rough, planar 175.0-175.1, 175.2-175.4, 176.55-176.81, 177.1-177.5' - Fracture zone (4), fine to coarse angular to subangular gravel-sized limestone fragments 175.1, 175.2, 175.4, 175.85, 175.9, 175.55, 176.8, 177.3, 177.5' - Bedding plane (9), rough, undulating, sand/fine gravel in fractures, open up to 1" 176.2, 176.3' - Bedding plane (2), rough, undulating, little sand in fractures, open <1/4"	Limestone 175.0-177.8' - Same as 170.0-172.0' except weak to medium strong rock (R2-R3) No Recovery 177.8-180.0'	R22: 5 minutes
180 -139.5	R22-NQ 5 ft 56%	>10	8	<p>180.0-180.91' - Fracture zone, fine to coarse gravel-sized angular to subrounded gravel</p>	<p>Limestone 180.0-181.4' - Same as 170.0-180.0' except from 180.9-181.4' fossiliferous with many molds and casts, voids (<1/16") over 50-60% of surface, many cavities up to 1"x1/2" No Recovery 181.4-185.0'</p>	R23: Runtime not recorded	
185 -144.5	R23-NQ 5 ft 28%	>10	9		Bottom of Boring at 185.0 ft bgs on 6/6/2007	12:00 Last rock core completed, total depth is 185.0' below ground surface	



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 1 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
40.0	0.0	0.6	SS-1	2-4-5 (9)	Topsoil (OL) 0.0-0.6' - dark gray to grayish black, (N2 to N3), trace fine silica sand, abundant organic material		
	1.5						
5	5.0						
35.0		0.9	SS-2	6-7-6 (13)	Clayey Sand (SC) 5.0-5.9' - moderate yellowish brown and dark yellowish brown, (10YR 5/1 and 10YR 4/2), moist, medium dense, very fine to fine grained, silica sand, 25-30% low to medium plastic fines, trace root fragments		
	6.5						
10	10.0						
30.0		1.1	SS-3	7-9-12 (21)	Silty Sand (SM) 10.0-11.05' - pale yellowish brown, (10YR 6/2), wet, medium dense, 20% nonplastic to low plastic fines, fine silica sand		
	11.5						
15	15.0						
25.0		1.4	SS-4	6-8-10 (18)	Silty Sand (SM) 15.0-16.4' - Same as 10.0-11.05'		
	16.5						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 2 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
20.0	20.0	1.2	SS-5	11-12-12 (24)	Silt Sand (SM) 20.0-21.2' - Same as 15.0-16.4'		
	21.5						
25	25.0	0.9	SS-6	5-4-5 (9)	Silty Sand (SM) 25.0-25.9' - Same as 20.0-21.2'		
15.0	26.5						
30	30.0	1.5	SS-7	2-3-2 (5)	Silty Sand (SM) 30.0-31.5' - Same as 25.0-25.9'		
10.0	31.5						
35	35.0	1.4	SS-8	5-8-7 (15)	Sandy Lean Clay Or Sandy Organic Soil (CL-OL) 35.0-35.7' - dark gray to grayish black, (N3 to N2), moist, stiff, low to medium plasticity, slow dilatancy, 30% very fine silica sand Silty Sand (SM) 35.7-36.4' - pale yellowish brown mottled with dark yellowish brown, (10YR 6/2 mottled with 10YR 4/2), wet, medium dense, very fine to fine silica sand, 30-35% low plastic fines		35.0-35.7' appears organic rich
5.0	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 3 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (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		
	41.5						
45	45.0	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 plastic fines		45.6-46.5' appears organic rich
-5.0	46.5						
50	50.0	1.2	SS-11	30-40-45 (85)	Silt (ML) 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		
-10.0	51.5						
55	55.0	1.1	SS-12	8-5-12 (17)	Silty Sand With Limestone (SM) 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		Driller's Remark: hard drilling at 53.5'
-15.0	56.5						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 4 OF 9
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-20.0	60.0	0.9	SS-13	25-50/5.5 (75/11.5")	<p>Silty Sand With Limestone (SM) 60.0-60.9' - Same as 50.0-51.2' except 35-40% fine gravel-sized limestone fragments</p>	Driller's Remark: Depth to water 5.2' below ground surface
	61.0					
65 -25.0	65.0	0.1	SS-14	50/3 (50/3")	<p>Limestone Fragments 65.0-65.1' - dark yellowish brown, (10YR 4/2), mild HCl reaction, some black organic staining on bedding planes</p>	<p>Driller's Remark: soft drilling at 66.67', Rig chatter at 67.0' harder drilling</p>
	65.3					
70 -30.0	70.0	0.7	SS-15	26-50/3 (76/9")	<p>Sandy Silt And Limestone Fragments (ML) 70.0-70.7' - pale yellowish brown, (10YR 6/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 40% ML and 60% limestone, 25-30% fine to coarse sand-sized; fine to coarse gravel-sized limestone fragments, carbonate materials</p>	
	70.8					
75 -35.0	75.0	0.8	SS-16	50-37-27 (64)	<p>Silty Sand With Limestone (SM) 75.0-75.75' - moderate yellowish brown, (10YR 5/4), moist, very dense, fine to coarse grained, mild HCl reaction, 35-40% low plastic fines, 15% fine gravel-sized limestone fragments, carbonate materials</p>	
	76.5					
	80.0	0.0	SS-17	50/1 (50/1")	<p>No Recovery 80.0-80.1'</p>	
	80.1					
80						<p>Begin Rock Coring at 80.0 ft bgs See the next sheet for the rock core log</p>



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-40.0	80.0	8	3	80.15' - Bedding plane, horizontal, smooth, open		Limestone Fragments 80.0-81.35' - light olive gray, (5Y 5/2), moderate HCl reaction, very weak to weak (R1 to R2), fossiliferous (voids, casts, molds), voids up to 1/16", some cavities generally <6/16"x6/16" Limestone 81.35-82.3' - pale greenish yellow, (10Y 8/2), fine to very fine grained, strong HCl reaction, weak to medium strong (R2 to R3), <2% voids and cavities, variegated color with contact at 81.9' No Recovery 82.3-85.0' Limestone 85.0-90.0' - yellowish gray with pale greenish yellow mottling, (5Y 7/2 with 10Y 8/2), fine grained, mild HCl reaction, very weak to weak (R1 to R2), lithoclasts like fractures at 86.0-86.4' and 87.0-87.4' (light colored limestone with few voids); fossiliferous (casts and molds), voids and cavities up to 3/8"-3/4"x3/8" over 40-50% of surface 90.0-90.9' - mottled yellowish gray to light olive brown, (5Y 7/2 to 5Y 5/6), fine to very fine grained, mild to moderate HCl reaction, very weak (R1), fossiliferous (molds/casts) with very fine grained yellowish gray possible intraclasts in the structure, voids and cavities up to 3/16"-3/8" over 50-60% of surface 90.9-92.0' - very light gray mottled medium gray with dusky yellow to moderate olive brown, (N8 mottled with N6 with 5Y 6/4 to 5Y 4/4), very fine grained, strong HCl reaction, weak (R2), <2% cavities, voids up to 3/16" over 15-20% of rock surface 92.0-93.4' - Same as 90.9-92.0' except pale yellowish brown to light olive brown, (10YR 6/2 to 5Y 5/6), mottled, very fine grained, mild to moderate HCl reaction, cavities and voids more common than above with some cavity infilling (strong HCl reaction), cavities and voids up to 20-25% 93.4-95.0' - Same as 90.9-92.0' except voids up to 20-25%	Switching over to NQ coring at 80.0'	
			4	80.35' - Fracture, 30 deg, rough, stepped, black organic film over 15-20%, tight				
			10	80.6' - Fracture, 50-60 deg, rough, undulating, tight				
	R1-NQ 5 ft 46%		NR	81.03' - Fracture, 0-80 deg, rough, stepped, tight 81.35' - Bedding plane, horizontal, smooth, stepped, open 81.67, 81.8' - Bedding plane, horizontal, smooth, open 82.2' - Bedding plane, horizontal, smooth, open			R1:7 minutes	
85	85.0	44	1	85.9' - Fracture or mechanical break, horizontal, rough, undulating, tight		Core fell out upon retrieval, had to make multiple trips to get rock out of outer barrel No circulation below 80.0' R2:5 minutes		
-45.0			1	86.6-87.75' - Fracture zone, vertical, rough, undulating, tight				
			2	88.4-88.8' - Fracture zone, 0-<5 deg, rough, undulating, tight to open				
			3	89.15-89.3' - Fracture zone, 0-90 deg, Undulating to stepped, tight to open				
90	90.0	90	3	89.6' - Fracture, 0-90 deg, rough, Undulating to stepped, open		R3:9 minutes		
-50.0			1	90.7' - Fracture, <5 deg, rough, undulating, tight				
			0					
	R3-NQ 5 ft 100%		0					
		74	1	93.4' - Bedding plane, horizontal, rough, undulating, tight		R4:9 minutes		
95	95.0		2	94.6' - Fracture, horizontal, rough, undulating, tight				
-55.0			1	94.9' - Fracture, horizontal, rough, undulating, tight				
			0	95.2' - Bedding plane, horizontal, smooth, undulating, open				
		10	1	97.5' - Bedding plane, <5 deg, rough, undulating, open				
			2	98.5' - Bedding plane, horizontal, smooth, undulating, open, organic material				
			NR	98.8' - Fracture, 20 deg, rough, undulating, tight				
100	100.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 6 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 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-60.0	R5-NQ 5 ft 88%	37	10	99.35' - Fracture zone, 0-90 deg, rough, undulating to stepped, open	[Symbolic Log]	Limestone 95.0-98.4' - variegated light olive brown to yellowish gray, (5Y 5/6 to 5Y 7/2), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), fossiliferous (mold/casts) with some organic 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 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' 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, 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 HCl 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' 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'	R5:6 minutes	
105			4	100.0-100.3' - Fracture zone, 0-90 deg, smooth, open				
-65.0			4	100.7-100.9' - Fracture, 70 deg, rough, undulating, tight				
105.0			4	101.2, 101.3' - Bedding plane (2), horizontal, smooth, undulating, open, black organic staining over 35%				
-70.0			1	101.8-102.5' - Fracture zone, 0-90 deg, rough, Stepped to undulating, open to tight				
110			10	102.65, 102.8, 102.98, 103.17' - Bedding plane (4), 0-<5 deg, rough, undulating, open				
-75.0	NR	104.1-104.4' - Fracture zone, 0-90 deg, open						
110	R6-NQ 5 ft 74%	33	4	105.12' - Bedding plane, 0-<5 deg, smooth, Planar to stepped, open	[Symbolic Log]	105.0-108.7' - yellowish gray, (5Y 8/1), very fine grained, strong HCl 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' 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'	R6:6 minutes	
110			4	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				
-70.0			1	105.95' - Bedding plane, horizontal, smooth, planar, tight to open				
115			10	106.3' - Fracture, 30-40 deg, rough, stepped, tight				
-75.0			NR	106.5, 106.7, 106.95' - Bedding plane (3), horizontal, smooth, undulating, tight to open				
115			NR	107.85' - Fracture, 0-90 deg, rough, stepped, tight				
115	R7-NQ 5 ft 98%	78	0	108.2' - Bedding plane, <5 deg, rough, stepped, open	[Symbolic Log]	105.0-108.7' - yellowish gray, (5Y 8/1), very fine grained, strong HCl 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' 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'	R7:7 minutes	
115			0					
-70.0			0					
115			1	113.9' - Bedding plane, horizontal, rough, undulating, open				
-75.0			10	113.9-114.1' - Fracture, vertical, rough, undulating, open				
115			NR	114.1' - Bedding plane, 0-30 deg and 30 deg, rough, undulating, open				
115	R8-NQ 5 ft 86%	74	2	114.5' - Bedding plane, horizontal, rough, planar, open	[Symbolic Log]	105.0-108.7' - yellowish gray, (5Y 8/1), very fine grained, strong HCl 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' 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	
115			0	114.6-114.9' - Fracture zone, horizontal, rough, planar, limestone fragments, open				
-70.0			1	115.1' - Fracture zone, smooth, planar and undulating, limestone fragments				
115			3	115.25, 117.55, 118.18, 118.53, 118.55, 119.3' - Bedding plane (6), smooth, undulating to planar, open				
-75.0			NR					
120			NR					



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 ORIENTATION : Vertical
 WATER LEVELS : 5.2 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-80.0	R9-NQ 5 ft 88%	24	4	120-120.35' - Fracture, vertical, smooth, planar	[Symbolic Log]	Limestone 115.0-119.3' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), "chalk-like" texture, zones where voids and cavities are nearly absent grades to zones/thin beds with voids up to 1/16" covering 20-30% (e.g. 116.1-116.2') cavities, <2% (more abundant near beginning of run, up to 3/8"x3/8"); fossil void to rate, becoming slightly more common at base of run No Recovery 119.3-120.0' Limestone 120.0-122.7' - Same as 115.0-119.3' 122.7-124.4' - Same as 120.0-122.7' except more voids/cavities up to 75-80% of surface covered with voids 1/16", cavities up to 3/8"-3/4"x3/8"-3/4", fossiliferous (molds/casts) No Recovery 124.4-125.0' Limestone 125.0-129.3' - Same as 122.7-124.4' except some thin laminations at base of interval 129.3-129.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, medium strong (R3), laminated bedding, thick, laminae incline 10-15 deg, 1 cavity 3/8"x3-7/8", voids less than 1/16" over 10-15% of surface, dense limestone No Recovery 129.5-130.0' Limestone 130.0-133.5' - yellowish gray, (5Y 8/1), strong HCl reaction, weak to very weak (R2 to R1), voids up to 1/16" or less over 5-10% of surface, rare cavities (3/16"x3/16"), trace fossil molds/casts; thin lamination in upper 0.1-0.2' of section No Recovery 133.5-135.0' Limestone 135.0-139.5' - Same as 130.0-133.5' except cavities and voids more frequent becoming fine to medium grained at 166.67' with some fossils, cavities becoming common with depth up to 3/8"-3/4"x3/8", some mottling (coating of limestone matrix) becoming extremely weak rock (R0) at 138.4' to 139.0', thick laminated from 138.0-139.5', few voids No Recovery 139.5-140.0'	R9:5 minutes
			2	120.35' - Fracture, 40 deg, rough, undulating, tight			
			7	120.55' - Fracture, 0-60 deg, smooth, planar, open			
			8	120.75' - Bedding plane, horizontal, undulating, open			
			4	121.35' - Bedding plane, horizontal, smooth, stepped, tight			
			NR	121.97, 122.25, 122.37, 122.7, 122.77, 122.87, 123.0, 123.15, 123.4, 123.5, 123.55, 123.63, 123.7, 123.82, 123.88, 123.9, 140.1, 140.2, 140.3, 140.45' - Bedding plane (20), horizontal, rough, undulating to stepped, open			
125 -85.0	R10-NQ 5 ft 90%	25	6	125.3, 125.47, 125.57, 125.67, 125.82, 125.96, 126.05, 126.12, 126.27, 126.32, 126.51, 126.65, 126.72, 126.90, 127.15, 127.25, 127.35, 127.48, 127.7, 127.78, 127.92, 128.0, 128.07' - Bedding plane or mechanical break (23), horizontal, rough, undulating to stepped, open			
			8				
			8				
			1				
			2				
130 -90.0	R11-NQ 5 ft 70%	8	NR	129.3' - Bedding plane, 10-15 deg, smooth, planar, tight			
			3	129.48' - Bedding plane, <5 deg, smooth, stepped, open			
			7	130.25, 130.58, 130.9, 131.2, 131.28, 131.5, 131.55, 131.64, 131.78, 131.97, 132.13, 132.35, 132.42, 132.47, 132.68, 132.92, 132.97, 133.05' - Bedding plane (18), horizontal, smooth, undulating to planar, open			
			7				
			2				
135 -95.0	R12-NQ 5 ft 90%	0	NR				
			5	135.1, 135.2' - Bedding plane (2), horizontal, smooth, undulating, open			
			7	135.3' - Bedding plane or fracture, 0-60 deg, rough, stepped to undulating, open			
			5	135.5-136.65' - Fracture zone, 0-90 deg, smooth, undulating, gravel			
			>10	136.72, 136.82, 136.92, 137.05, 137.27, 137.5' - Bedding plane (6), horizontal, rough, undulating, open			
			2	137.6' - Bedding plane or fracture, 0-50 deg, smooth, undulating, open			
140			NR	138.04, 138.25, 138.4' - Bedding plane (3), horizontal, rough, undulating, open 138.4-139.0' - Fracture zone, 0-90 deg, smooth to rough, undulating to stepped, open			



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 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
-100.0	R13-NQ 5 ft 84%	10	5	139.25' - Bedding plane, horizontal, rough, stepped to undulating, open	|	Limestone 140.0-144.2' - variegated yellowish gray with gray laminae, (5Y 8/1 to 5Y 9/2), very fine to fine grained, strong HCl reaction, weak to very weak (R2 to R1), voids and cavities, 3-5% becoming 10-15% with depth, fossiliferous with trace echinoids in top portion, molds and casts increase with depth (5-10%), thick laminated 133.9-134.0'	R13:6 minutes		
6			140.3, 140.42, 140.6, 140.75, 140.95' - Bedding plane or mechanical break (5), horizontal, smooth, planar to undulating						
6			141.18, 141.28, 141.33, 141.39, 141.5, 141.8' - Bedding plane or mechanical break (6), horizontal, smooth, planar to undulating						
6			142.0, 142.08, 142.18, 142.46, 142.75, 142.9' - Bedding plane or mechanical break (6), horizontal, smooth, planar to undulating						
2			143.05, 143.13, 143.65, 143.88, 143.95, 143.98' - Bedding plane or mechanical break (6), horizontal, rough, planar to undulating						
145	R14-NQ 5 ft 84%	10	NR	144.08, 144.18' - Bedding plane or mechanical break (2), horizontal, rough, planar to undulating	|	No Recovery 144.2-145.0' Limestone 145.0-147.1' - light gray to medium gray, (N7 to N6), very fine grained, strong HCl reaction, medium strong (R3), fossiliferous (molds and casts) over 3-5%, voids up to 1/16" over 3-5% of surface 147.1-149.2' - yellowish gray grading to medium gray with depth, (5Y 7/2 to N5), fine grained, mild to moderate HCl reaction, thinly laminated in upper 0.5', trace fossil molds/casts, 1 cavity 3/8"x2", voids up to 1/16" over 15-20% of surface, some dissolution features (cavities) at 148.2' as discontinuous bedding plane voids No Recovery 149.2-150.0' Limestone 150.0-150.9' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to mild HCl reaction, medium strong (R3), becomes thinly laminated with depth, voids up to 1/16" over 30-40% of surface with trace thin laminae of very fine limestone with few voids 150.9-151.8' - variegated yellowish gray, dusky yellow to light olive brown, (5Y 7/2, 5Y 6/4 to 5Y 5/6), coarse grained, strong HCl reaction, weak (R2), abundant possible lithoclasts (possible conglomeratic) Limestone 151.8-153.3' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2), medium grained, weak (R2) 153.3-155.0' - Same as 150.0-150.9' except thinly laminated, voids up to 1/16" over 5-10%, mild to strong HCl reaction with depth, some early fracture development/dissolution at 154.7'	R14:6 minutes		
-105.0			>10	145.0-147.25' - Fracture zone, 0-90 deg, limestone gravel, stepped, undulating, smooth to rough, open					
150			R15-NQ 5 ft 100%	90				10	147.25' - Bedding plane, horizontal, rough, undulating, open
155								7	147.3, 147.45, 147.52, 147.92, 148.0, 148.05, 148.24, 148.65' - Bedding plane (8), 0-5 deg, undulating to planar, rough to smooth, some organic black coating over 70-80% of surfaces
-110.0								1	148.65-148.90' - Fracture zone
155	0	150.9' - Bedding plane, horizontal, rough, undulating							
-115.0	1	152.55' - Bedding plane, horizontal, rough, undulating, tight							
160	R16-NQ 5 ft 98%	76	14	153.25-153.4' - Fracture zone, 0-90 deg, rough	|		R15:6 minutes		
155			1	153.5' - Bedding plane or fracture, horizontal, rough, planar, open					
-115.0			0	153.5-153.85' - Fracture, 80-90 deg, rough, undulating, tight					
160			1	156.4, 157.15, 157.25, 157.33, 157.52, 157.65, 157.73, 157.96' - Bedding plane (8), 0-5 deg, rough, undulating, open to tight					
160			7	158.0, 158.15, 158.22' - Bedding plane (3), horizontal, smooth, undulating, open					
160	R16-NQ 5 ft 98%	76	3	159.1' - Bedding plane, 0-5 deg, rough, undulating, open	|		R16:8 minutes		
160			2	159.5' - Fracture, 50 deg, rough, stepped, tight					
160			NR						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-04	SHEET 9 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 ft bgs on 5/31/2007 START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					<p>Limestone 155.0-157.25' - variegated yellowish gray to light gray brownish gray, (5Y 7/2 to N7), fine grained, mild to moderate HCl 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 HCl 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 HCl 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 HCl 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</p>		



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 bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
41.3	0.0	1.2	SS-1	1-2-3 (5)	Topsoil 0.0-0.2' - olive black, (5Y 2/1), roots, organics Poorly Graded Sand With Organics (SP) 0.2-1.2' - pale yellowish brown grading to moderate yellowish brown at 0.95', (10YR 6/2 to 10YR 5/4), moist, loose, very fine to fine silica sand, trace nonplastic fines, 15% organics decreasing with depth		10:59 Begin drilling Driller's Remark: Hammer by M. Craus (manual with NWJ rod)
5 36.3	5.0	0.9	SS-2	3-2-2 (4)	Silty Sand (SM) 5.0-5.9' - pale yellowish brown to light olive gray, (10YR 6/2 to 5Y 6/1), moist to wet, very loose, very fine to fine silica sand, 25% nonplastic fines, becoming low plastic at 5.7'		
10 31.3	10.0	0.9	SS-3	8-14-18 (32)	Silt (ML) 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		
15 26.3	15.0 15.3	0.2	SS-4	50/3 (50/3")	Poor Recovery Limestone Fragments 15.0-15.2' - grayish orange, (10YR 5/4), moderate HCl reaction, fragments up to 1/2"		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-05	SHEET 2 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 bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
21.3	20.0	1.2	SS-5	28-42-36 (78)	Silt (ML) 20.0-21.2' - dusky yellow to grayish orange, (5Y 6/4 to 10YR 7/4), wet, nonplastic, rapid dilatancy, moderate HCl reaction, 10-15% very fine to medium sand-sized, carbonate materials		
	21.5						
25	25.0	1.0	SS-6	32-30-25 (55)	Silty Sand (SM) 25.0-26.0' - grayish yellow, (5Y 8/4), wet, very dense, moderate HCl reaction, fine to coarse sand-sized, 30% nonplastic fines, 10-15% fine gravel-sized limestone, carbonate materials		
16.3	26.5						
30	30.0	1.0	SS-7	33-28-23 (51)	Silty Sand (SM) 30.0-31.0' - Same as 25.0-26.0'		
11.3	31.5						
35	35.0	0.9	SS-8	28-30-50/5 (80/11")	Silty Sand With Limestone (SM) 35.0-35.85' - Same as 30.0-31.0' except dark yellowish orange to grayish orange, (10YR 6/6 to 10YR 7/4), mild HCl reaction, 30% fine to coarse gravel-sized limestone fragments		
6.3	36.4						
40							Driller's Remark: 14:55 remove NWJ rod Driller's Remark: Casing set to 40.0'



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-05	SHEET 3 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 bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
1.3	40.0	0.8	SS-9	30-50/4 (96")	Sandy Silt With Limestone (ML) 40.0-40.85' - grayish olive mottled with olive gray, (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	Driller's Remark: 15:55 insert AWJ rod to clear out hole (with bit)	
40.8							
45 -3.7							
50 -8.7							
55 -13.7							
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-05	SHEET 4 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 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
41.0	R1-NQ 5 ft 92%	87	2	41.05' - Bedding plane, 10-25 deg, rough, undulating, open up to 1/2"		Limestone 41.0-45.6' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction, voids (up to 1/8") over <5-30% of surface with interclasts at 41.0-41.9' 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 molds up to 1" from 43.3-45.6' infill of highly voided and moderately fossiliferous material of the same color, with infill increasing to more than 70% of surface at 44.5', 41.0-43.1' very weak (R1), 43.1-44.4' medium strong (R3), 44.4-45.6' weak (R2)	5/5/07 08:07 begin coring 08:00 water level = 1.2' below ground surface
>5			41.7' - Bedding plane or mechanical break, 25 deg, rough, undulating				
1			42.95-43.1' - Fracture zone, intersecting fractures, fragments to 1"				
2			43.5' - Mechanical break				
1			43.6' - Bedding plane or mechanical break, 15-20 deg, rough, undulating				
45 -3.7	R2-NQ 5 ft 98%	38	NR	44.5' - Bedding plane, <10 deg, rough, undulating, open up to 1/4"		No Recovery 45.6-46.0' Limestone 46.0-49.05' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), poorly competent, friable, organic laminar features (discontinuous) from 46.0-46.5', some (<5%) dissolution features up to 1/4" poorly fossiliferous, extremely weak (R0) voids up to 1/16" over <5% of surface	R1:6 minutes
>10			44.8' - Bedding plane or mechanical break, 15-20 deg, rough, undulating				
2			45.25' - Bedding plane or mechanical break, <5 deg, rough, undulating				
0			46.0-46.9' - Fracture zone, multiple intersecting fractures, fragments up to 4"				
0			47.4, 47.6' - Bedding plane or mechanical break (2), <5 deg, rough, undulating				
50 -8.7	R3-NQ 5 ft 91%	66	NR	48.05' - Bedding plane or mechanical break, <5 deg, rough, undulating, open up to 1/8"		No Recovery 50.9-51.0' Limestone 49.05-50.9' - moderate HCl reaction, very weak to weak (R1 to R2), moderate to highly fossiliferous, casts up to 1"x1/2", voids to 1/16" over 15% of surface	R2:3 minutes
0			48.5-48.7' - Fracture zone, multiple intersecting fractures, fragments up to 4"				
0			48.95' - Bedding plane or mechanical break, <5 deg, rough, undulating, broken on edges of fractures open up to 1/2"				
2			49.7' - Mechanical break				
0			51.15' - Bedding plane, 10 deg, rough, undulating, open up to 1/4"				
55 -13.7	R4-NQ 5 ft 78%	30	0	51.75' - Bedding plane, with missing pieces (could be associated with dissolutions), open 1"		No Recovery 55.55-56.0' Limestone 51.0-54.5' - Same as 49.0-50.9' except fossils are moderate and up to 1/4", <1/16" voids over 20-30% of surface, infill of medium light gray (N6) and medium gray (N5) up to 1/8"x1/4", possibly breccia	R3:3 minutes
>10			53.5' - Mechanical break				
1			54.5-54.6' - Fracture zone, multiple intersecting fractures, 1" fragments				
NR			54.95' - Bedding plane, 25 deg, rough, undulating, open up to 1", associated dissolution and in softer material				
3			55.4' - Bedding plane, <5 deg, rough, undulating				
60 -18.7	R4-NQ 5 ft 78%	30	>5	56.3' - Fracture, 50 deg, rough, undulating, with silt-sized fragments		54.5-55.55' - Same as 46.0-49.05' except no organics, infill clasts at 51.0-54.5', dissolution feature at 54.95' (1-1/4"x3/4")	R4:4 minutes
>5			56.5' - Bedding plane or mechanical break, <5 deg, rough, undulating, open				
>5			56.75' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"				
4			57.1-57.3' - Fracture zone, intersecting fractures, up to 2" fragments				
NR			58.7-59.0' - Fracture zone, intersecting fractures, up to 2" fragments, associated laminar organics				
61.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-05	SHEET 5 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 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
65 -23.7	R5-NQ 5 ft 98%	9	>10	59.15' - Bedding plane, 10 deg, rough, undulating, open up to 1/4"		Limestone 58.5-59.9' - moderate yellowish brown, (10YR 5/4), fine grained, 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 plane laminations between 58.7-59.9' No Recovery 59.9-61.0' Limestone 61.0-65.9' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to 10YR 5/4), very fine to fine grained, mild HCl reaction, very weak to weak (R1 to R2), occasional sections of extremely weak (R0), moderately competent and friable (variably), voids (1/16") over 5-10% of surface, sections with intermittent voids (1/16") over 25-30% of surface (secondary infill of 1"-2" cavities), very fine (<1/16" thick) black laminations decrease with depth No Recovery 65.9-66.0' Limestone 66.0-67.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16"-1/8") over 20-30% of surface, trace shallow cavities up to 1/4", trace organic inclusion (spheroid and laminar) 67.2-67.6' - moderate olive brown, (10YR 5/4), mild to moderate HCl reaction, weak to very weak (R2 to R1), voids (1/16") over 5% of surface, 10% having 2" infill with voids (1/16") over 25-30% of surface, fine darker laminations increasing with depth 67.6-68.3' - Same as 66.0-67.2' 68.3-71.0' - Same as 67.2-67.6' 71.0-75.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, 71.5-72.0' and 75.0-75.8' extremely weak (R0), weak to medium strong (R2-R3), moderately fossiliferous, casts up to 1/4", organic inclusions over <5% up to 1/2"x1/8", <1/16" voids over 30-40% of surface, competent No Recovery 75.8-76.0'	R5:4 minutes
66.0			3	59.25' - Bedding plane, 10 deg, rough, undulating, open up to 1/8", very thin infill of silt			
			>10	59.35' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"			
			>5	59.65' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"			
			2	61.3-61.5' - Fracture zone, intersecting fractures, fragments to <1/16" to 2"			
			NR	61.9' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"			
			0	62.3' - Fracture, 60 deg, rough, undulating			
			1	62.5' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"			
			2	62.6' - Fracture, 60 deg, rough, undulating, opposite direction and possibly associated			
			4	63.1' - Fracture, 60 deg, rough, undulating			
70 -28.7	R6-NQ 5 ft 100%	57	1	63.15' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"			R6:6 minutes
			2	63.3' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"			
			3	63.9-63.95' - Fracture zone, intersecting fractures, fragments to 1/2"			
			3	64.5' - Mechanical break			
			2	64.7-64.9' - Fractures, 40-85 deg, rough, undulating, intersecting high angle			
			1	65.1' - Fracture, 80-85 deg, rough, undulating, continuation of a fracture in 64.7-64.9'			
			2	65.7' - Bedding plane, rough to smooth, undulating, bottom has fragments to 30 deg angle, top is <5 deg angle			
			1	67.25' - Bedding plane, <10 deg, rough to smooth, undulating, along organic bedding plane			
			0	68.3' - Bedding plane, <10 deg, smooth, undulating to planar			
			3	68.5, 68.6' - Mechanical break (2)			
75 -33.7	R7-NQ 5 ft 96%	50	3	68.9' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane			R7:2 minutes
			1	69.0' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane			
			NR	69.15, 69.2' - Bedding plane (2), <10 deg, smooth, undulating, along organic bedding plane			
			>5	69.17' - Bedding plane, >85 deg, smooth, undulating			
			3	70.0' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane			
			3	70.6, 70.62' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane			
			3	71.05' - Bedding plane, <5 deg, rough, undulating, associated with organic fractures, open to 1/4"			
			>10	71.6' - Bedding plane or mechanical break, 30 deg, rough, undulating			
			NR				
			NR				
80 -38.7	R8-NQ 5 ft 70%	23	NR				R8:4 minutes
81.0							



PROJECT NUMBER:
338884.FL

BORING NUMBER:
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 ft bgs on 5/5/07

START : 5/4/2007

END : 5/6/2007

LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION					
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS					
85 -43.7	R9-NQ 5 ft 90%	28	3	72.5' - Bedding plane, top is <5 deg, bottom is 30 deg, piece missing, open to 1" associated with softer zone at bottom	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 and below to 76.3-77.0'	R9:8 minutes			
			>5	72.85, 73.4, 73.5' - Mechanical break (3)					
			1	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					
			1	74.15' - Fracture, 50 deg, rough, undulating, open up to 1/4"					
			1	74.2' - Bedding plane, top is <5 deg, bottom is 30 deg, piece missing, open to 1" associated with softer zone at bottom					
	86.0	R10-NQ 5 ft 40%	53	NR			75.0' - Bedding plane or mechanical break, <5 deg, rough, undulating	Limestone 76.3-77.0' - grayish orange, (10YR 7/4), fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 20-30% of surface, trace cavities <1/4", trace fine (1/16") black inclusions	Water level = 3.0' below ground surface
				1			75.4, 75.5' - Mechanical break (2)		
				1			76.6' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"		
				1			76.6-76.9' - Fracture zone, intersecting fractures, fragments to 2"		
				NR			77.0-77.7' - Same as 76.0-76.3'		
90 -48.7	R11-NQ 5 ft 82%	18	NR	77.7-78.8' - Same as 76.3-77.0'	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 orange (10YR 8/2) infill up to 4"x2" from 10-40% of surface (infilling poorly fossiliferous, trace voids to 1/16")	R10:5 minutes			
			>10	77.95' - Bedding plane, <5 deg, rough, undulating, associated with soft material					
			>10	78.1' - Bedding plane, <5 deg, rough, undulating, open up to 1", associated with soft material					
			>10	78.5' - Bedding plane, <5 deg, rough, undulating, associated with soft material					
			0	78.7' - Bedding plane, <5 deg, rough, undulating, open up to 1/4", associated with soft material					
95 -53.7	R12-NQ 5 ft 98%	95	>5	79.3' - Bedding plane, <5 deg, rough, undulating	Limestone 85.1-85.25' - dark yellowish brown, (10YR 4/2), strong HCl reaction, clay lens	R11:5 minutes			
			0	79.4-79.5' - Fracture zone, intersecting fractures, fragments up to 1"					
			>10	81.3' - Bedding plane, <5 deg, rough, undulating, <1/8" open					
			NR	81.5' - Bedding plane, rough, undulating, top <5 deg, bottom 30 deg					
			NR	81.95' - Bedding plane, <5 deg, rough, undulating, open up to 1/2"					
100 -58.7			1	82.6' - Fracture or fracture zone, 85 deg, rough, undulating, pieces missing	Limestone 86.0-88.0' - Same as 85.25-85.5' 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 moderate yellowish brown (10YR 5/4)	R12:5 minutes			
			0	83.3' - Bedding plane, <5 deg, rough, undulating, open up to 1/2"					
			0	83.5, 83.75, 84.05' - Mechanical break (3)					
			>5	84.75' - Bedding plane, <5 deg, rough, undulating, mostly not open, missing fragments on small part of fracture (1/2")					
			0	85.2' - Bedding plane, <5 deg, rough, undulating, open up to 1"					
101.0			0	86.92' - Bedding plane, 20 deg, rough, undulating, silt infill described in lithology, no stain, open up to 6"					



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

WATER LEVELS : 1.2 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS			
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION							
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS							
105 -63.7	R13-NQ 5 ft 86%	18	NR	0	87.75' - Bedding plane, 20 deg, rough, undulating, open up to 1-1/2", no infill, associated with dissolution features		Limestone 91.0-92.9' - very fine grained, trace voids (1/16") over 30% of surface increasing with depth, dusky yellowish brown (10YR 2/2), friable, 5-30% fossils increasing with depth, 92.3-92.8' clay infill very pale orange (10YR 8/2) 92.9-95.1' - yellowish gray, (5Y 7/2), very weak to medium strong (R1 to R3), highly fossiliferous casts to 1/2", voids over 20% of surface up to 1/16", dissolution features to 3"x1"	R13:2 minutes			
			>10		91.4-91.5' - Fracture zone, fragments to 1/2"x3/4" intersecting fractures						
			>10		91.9' - Bedding plane, zone indurated with softer organic silt material						
			>10		92.1' - Bedding plane, <5 deg, rough, undulating, open up to 1/8"						
			>10		92.3, 92.5, 92.6' - Bedding plane (3), <5-20 deg, rough, undulating, infill (associated with infill of dissolution) described in lithology open up to 1/4"						
	110 -68.7	R14-NQ 5 ft 99%	95	NR	2	92.8-93.05' - Fracture zone, fragments to 1/2"x3/4" intersecting fractures			No Recovery 95.1-96.0' Limestone 96.0-100.9' - yellowish gray, (5Y 7/2), very fine grained, extremely weak to medium strong (R0 to R3), yellowish gray (5Y 8/1) to moderate yellowish brown (10YR 5/4) infill, voids up to 1/16" over 25% of surface, highly fossiliferous, casts and molds to 1/4", shallow dissolution features up to 2"x1-1/2"	R14:3 minutes	
				0		93.5' - Mechanical break					
				0		93.95' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"					
				0		95.0-95.01' - Fracture zone					
				0		96.1' - Bedding plane, <10 deg, rough, undulating, open <1/4"					
115 -73.7		R15-NQ 5 ft 100%	78	0		97.8' - 85-90 deg, rough, undulating, open up to 1/8"		No Recovery 100.9-101.0' Limestone 101.0-101.9' - yellowish gray mottled with pale yellowish brown, (5Y 7/2 with 10YR 6/2), very weak to extremely weak (R1 to R0), voids up to 1/16" over 15% of surface, fossiliferous casts and molds to 1/4", becomes softer with depth			R15:5 minutes
				2		97.95' - Bedding plane, <5 deg, rough, undulating, up to 1/8" open					
				1		98.1-98.2' - Fracture zone, fragments to 1", intersecting fractures					
				2		99.45' - Bedding plane, <10 deg, rough, undulating, open 1/8"					
				2		102.0-102.5' - Fracture zone, associated with soft material and organic features, intersecting fractures up to 2"					
120 -78.7	R16-NQ 5 ft 100%	62	0		102.5-103.25' - Bedding plane or fracture zone (10+), rough, undulating, up to 1/4" open		No Recovery 105.3-106.0' Limestone 106.0-110.95' - Same as 101.0-101.9' except very weak to weak (R1 to R2), highly fossiliferous, fossil casts and molds, trace to 15% <1/16" sized infill of very pale orange (10YR 8/2) decreasing with depth, trace organic features	R16:7 minutes			
			2		103.4-104.1' - Fracture zone, associated with soft material and organic features, intersecting fractures up to 2", fragments up to 2", highly fossiliferous with fossil molds (trace) same size as fragments						
			2		104.45' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open						
			2		104.7-105.1' - Fracture zone, some bedding, some intersecting, fragments to 2"						
			0		105.3' - Bedding plane, <5 deg, rough, undulating, up to 1/8" open						
			0		106.65, 108.1, 108.3, 108.5' - Mechanical break (4)						



PROJECT NUMBER: 338884.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

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

WATER LEVELS : 1.2 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
125 -83.7	R17-NQ 5 ft 100%	20	0	119.4' - Mechanical break		116.0-121.0' - Same as 111.0-116.0' except from 116.0-118.1' highly fossiliferous and fine grained fossil casts and molds to 1/2", medium light gray (N6) infill over <10%, voids up to 1/16" over 20% of surface and 118.1-121.0' fine grained to very fine grained, size decreasing with depth Limestone 121.0-126.0' - Same as 111.0-116.0' except 124.4-124.75' is mottled with pale orange (10YR 8/2)	R17:2 minutes
			1	122.5' - Fracture, 45 deg, rough, undulating			
			1	123.15' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open			
			>10	124.8-124.95' - Fracture zone, intersecting fractures, 1-1/2" fragments			
			3	124.8-124.95' - Fracture zone, intersecting fractures, 1-1/2" fragments			
126.0	R18-NQ 5 ft 100%	85	1	125.8-126.0' - Fracture zone, intersecting fractures, 1-1/2" fragments		126.0-131.0' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to weak (R1 to R2), grain size increasing with depth, <10-25% voids to 1/16", voids increasing with depth, moderately fossiliferous, fossils to 1/4", fossil size increasing with depth, trace dissolution zones to 1/2", 129.1-129.8' very fine to fine grained	R18:5 minutes
0			126.75' - 80 deg, rough, undulating, open 1/8" to tight (missing very small fragments in part of fracture)				
1			128.0' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open				
>10			129.1-129.8' - Bedding plane or mechanical break, <5 deg, rough to smooth, planar to undulating, tight, some have <1/8" open				
1			130.3' - Bedding plane, <5-30 deg, rough to smooth, planar to undulating, (break changes in middle of fracture, smoothness and planar change with angle), <1/8" open				
130 -88.7	R19-NQ 5 ft 100%	85	0	131.8' - Mechanical break		131.0-136.0' - Same as 126.0-131.0' except from 132.2-132.7' fine and very fine grained, trace organic content, moderate to highly fossiliferous (casts and molds), 133.35' 1/4" bedding plane of very light gray (N8)	R19:8 minutes
1			132.7' - Bedding plane, <10 deg, smooth to rough, undulating, up to 1/8" open				
0			133.2, 133.5, 133.6' - Mechanical break (3)				
1			134.05' - Bedding plane, 15-20 deg, rough, undulating, could be mechanical break due to drilling				
1			135.8' - Bedding plane, <5 deg, smooth, undulating, rock fragments				
135 -93.7	R20-NQ 5 ft 98%	44	0	136.2, 136.3, 137.4' - Mechanical break (3)		136.0-137.7' - Same as 131.0-136.0' except grades from moderate yellowish brown to yellowish gray (10YR 5/4 to 5Y 7/2), fine to very fine grained, extremely weak to weak (R0 to R1), very fine at 137.4', 1.2" thick moderate olive brown (5Y 4/4), trace voids to 1/16"	R20:10 minutes
2			137.7' - Bedding plane, <5 deg, rough, undulating, 1/2" open				
>5			137.95-138.3' - Bedding plane, <5 deg, smooth to rough, planar, <1/8" open except for 138.3' with up to 1/4" open				
1			138.5' - Mechanical break, along bedding plane				
0			138.6' - Bedding plane, <5 deg, rough, undulating, 1/4" open				
140 -98.7	141.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-05	SHEET 9 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 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
145 -103.7	R21-NQ 5 ft 82%	30	NR >10 5 >10 >10 0 NR	139.3' - Bedding plane, <5 deg, rough, undulating, open 140.15' - Fracture, 45 deg, rough, undulating, open 141.0-141.25' - Fracture zone, intersecting fractures, fragments 1", organic stain 141.6, 141.8' - Bedding plane (2), 10-20 deg, rough, undulating, organic stain, up to 1/4" open associated dissolution features 141.7' - Fracture, 85 deg, rough, undulating, organic stain, open to 1/8" 142.1' - Bedding plane, <5 deg, rough, undulating, organic stain 142.4, 142.5, 142.6' - Bedding plane (3), <5 deg, rough, undulating, up to 1/8" open 142.9' - Bedding plane, <5 deg, rough, undulating, up to 1/2" open 143.1-143.4' - Fracture zone, intersecting fractures, fragments to 1-1/2", organic stain 144.0-144.2' - Fracture zone, intersecting fractures, pieces to 1-1/2", organic stain 144.4' - Bedding plane, <5 deg, rough, undulating, up to 1/2"		Limestone 137.7-138.3' - moderate olive brown, (5Y 4/4), very fine grained, medium strong (R3), voids (up to 1/16") over 20% of surface, moderate fossils (casts) to 1/4"; interbedded with medium light gray (N6) with trace voids to 1/16", poorly fossiliferous 138.3-140.9' - Same as 131.0-136.0' except grades from poorly fossiliferous to moderate to high fossils, fossils up to 1/4" grades from trace voids (<1/16") to voids (1/16") over 10% of surface, interbeds of light olive gray (5Y 5/2) up to 1/2" thick, interbed (discontinuous or could be infill) at 138.75' very light gray (N8) and infill of same material seen in interbeds of light olive gray (5Y 5/2) at 140.15' that is 2" thick No Recovery 140.9-141.0' Limestone 141.0-144.2' - light gray to light olive gray, (N7 to 5Y 6/1), very fine grained, weak to medium strong (R2 to R3), voids (up to 1/16") over 10-15% of surface, fossils up to 1/4", dissolution features up to 2"x1/2", dusky yellow (5Y 6/2) infill very fine grained, voids over 25%, few 1/4"-1/2" dissolution features 144.2-145.1' - moderate yellowish brown with wavy light olive gray beds, (10YR 5/4 with 5Y 5/2), up to 1/2" thick and a 1-1/2" thick medium light gray (N6) bed, dusky yellow and light olive gray has 20-30% voids up to 1/16", fossils to 1/8" No Recovery 145.1-146.0' Limestone 146.0-150.8' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 7/2), fine to very fine grained, grain size increasing with depth, appears to have breccia clasts, yellowish gray (5Y 7/2), pale olive (10YR 6/2) and light gray (N7), moderately fossiliferous up to 1/4", at 148.9' abrupt change to light olive gray (5Y 6/1), very fine grained, strong to very strong (R4 to R5), trace voids to 20%, voids increase with depth, poorly fossiliferous with bedding features at 150.05-150.35' yellowish gray (5Y 8/1), olive gray (5Y 3/2) and pale yellowish brown (10YR 6/2) No Recovery 150.8-151.0' Limestone 151.0-152.8' - Same as 137.7-138.3'	R21:11 minutes	
150 -108.7	R22-NQ 5 ft 96%	62	1 1 1 4 >10 NR	144.7' - Bedding plane, <5 deg, rough, undulating, organic stain 144.9' - Bedding plane, 5 deg, rough, undulating, up to 1/4" open 146.35' - Bedding plane, <5 deg, smooth to rough, undulating, up to 1-1/2" open 147.1' - Fracture, 60 deg, rough, undulating 148.5' - Bedding plane, 10 deg, rough, undulating, up to 1/2" open 149.3, 149.45' - Fractures (2), 75-80 deg, rough, undulating 149.65' - Bedding plane, 20 deg, rough, undulating, open <1/8" 149.9' - Bedding plane, <5 deg, rough, undulating 150.25-150.4' - Fracture zone, intersecting fractures, 1" fragment 150.6-150.8' - Fracture zone, intersecting fractures, 1" fragment 151.15-151.3' - Fracture zone, intersecting fractures up to 1" 151.4, 151.6' - Bedding plane, <5 deg, rough, undulating, open up to 1/2"			R22:11 minutes	
155 -113.7	R23-NQ 5 ft 90%	56	>10 >5 1 2 2 NR	151.8' - Bedding plane, <5 deg, rough, undulating, up to 1/8" open 151.9-152.2' - Fracture zone, fragments to 2" 152.5' - Fracture, 65-70 deg, smooth, undulating, organic stain 152.6' - Bedding plane, <5 deg, rough, undulating, organic stain, <1/8" open 152.8' - Bedding plane, <5 deg, rough, undulating, associated with dissolution zone 153.3' - Fracture, 65-70 deg, smooth, undulating 154.4' - Fracture, 65-70 deg, smooth, undulating 154.8' - Fracture, 65-70 deg, smooth, undulating			R23:8 minutes	
156.0							11:10 water level 3.0' 11:11 grout hole, used 31 bags of grout	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 1.2 ft bgs on 5/5/07 START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					Limestone 152.8-154.4' - yellowish gray mottled with pale olive, (5Y 7/2 with 10Y 6/2), very fine grained, organic laminations at 153.55', dissolution features to 1/2"x1/4", moderately fossiliferous, fossils to 1/4", voids (1/16") over <10% of surface 154.4-155.5' - Same as 137.7-138.3' 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		



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
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.5	0.0	1.1	SS-1	1-2-2 (4)	<p>Poorly Graded Sand (SP) 0.0-0.8' - very light gray to brownish gray, (N8 to 5YR 4/1), brownish gray mottling, moist, soft, very loose, fine grained, no HCl reaction, silica sand, dark mottling (organics) and 5% organics as roots and debris</p> <p>Sandy Organic Soil (OL) 0.8-1.1' - brownish black, (5YR 2/1), moist, no HCl reaction, organic matter and/or nonplastic silt, 20% fine silica sand, organics as roots</p>	Encountered water between 0.8' and 5.0', water level at 2.5' below ground surface at 14:15
	1.5					
5 37.5	5.0	1.2	SS-2	1-3-4 (7)	<p>Silty Sand (SM) 5.0-6.2' - moderate yellowish brown, yellowish gray, (10YR 5/4, 5Y 8/1), wet, loose, fine grained, nonplastic, moderate yellowish brown transitioning to yellowish gray, fine silica sand with 20-30% fines</p>	
	6.5					
10 32.5	10.0	0.8	SS-3	2-4-14 (18)	<p>Silty Sand (SM) 10.0-10.2' - yellowish brown, (5Y 7/2), wet, medium dense, fine grained, no HCl reaction, fine silica sand with 20% plastic fines</p> <p>Clayey Sand (SC) 10.2-10.75' - yellowish gray, (5Y 8/1), wet, medium dense, fine to coarse grained, low to medium plasticity, moderate HCl reaction, 30% low to medium plastic fines, one coarse gravel-sized limestone fragment, organic lens from 10.55-10.6'</p>	Driller's Remark:11.5-15.0' heavy chattering
	11.5					
15 27.5	15.9	0.1	SS-4	50/1.5 (50/1.5")	<p>Silt (ML) 15.0-15.1' - grayish yellow, (5Y 8/4), moist, nonplastic, rapid dilatancy, moderate HCl reaction, (5-10%) very fine sand-sized limestone fragments with coarse sand-sized to fine gravel-sized, carbonate materials</p>	Driller's Remark:15.2-16.0' heavy chattering
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-06	SHEET 2 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
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)						
22.5	20.0	0.2	SS-5	50/2 (50/2")	Limestone Fragments 20.0-20.2' - grayish yellow, (5Y 8/4), strong HCl reaction, fragments to 3/16" in size		
25	25.0	1.1	SS-6	28-30-45 (75)	Silty Sand (SM) 25.0-26.1' - grayish orange, (10YR 7/4), moist, very dense, mild to moderate HCl reaction, fine to coarse sand-sized and trace gravel-sized, 35% nonplastic fines		
17.5	26.5						
30	30.0	0.9	SS-7	20-13-8 (21)	Silty Sand (SM) 30.0-30.85' - Same as 25.0-26.1' except moderate to strong HCl reaction, grayish yellow limestone (10YR 7/4), from 30.7-30.85' and very stiff, not hard		
12.5	31.5						
35	35.0	0.2	SS-8	50/2.5 (50/2.5")	Silty Sand (SM) 35.0-35.15' - Same as 25.0-26.1'		
7.5	35.2						
40							



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
 DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#	TYPE				
2.5	40.0	0.1	SS-9	50/1 (50/1")	Limestone Fragments 40.0-40.1' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, carbonate		Driller's Remark: Heavy chatter throughout except no chatter at 41.0-41.5'
45 -2.5	45.0 43.2	0.2	SS-10	50/2 (50/2")	Silty Sand And Limestone (SM) 45.0-45.2' - light olive gray, (5Y 5/2), wet, very dense, fine to coarse grained, moderate HCl reaction, fine to coarse sand-sized, 20-25% fines, 40% of sample is coarse sand to fine gravel-sized limestone fragments		
50 -7.5	50.0	1.3	SS-11	45-25-40 (65)	Silty Sand And Limestone (SM) 50.0-51.25' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine grained, moderate HCl reaction, 20-25% low plastic fines, 35-40% of sample is coarse sand to fine gravel-sized limestone fragments		
55 -12.5	55.0	0.2	SS-12	7/1-1/24 (8/25")	Limestone And Silty Sand (SM) 55.0-55.2' - Same as 50.0-51.25' except 60% of sample is limestone, 40% of sample is silty sand		Driller's Remark: During SPT for SS-12, spoon fell 2.0' after 7 blows over 1 inch, possible 2' void at 55.1'
60	57.1						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-06	SHEET 4 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
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.5	60.0	1.2	SS-13	Silty Sand And Limestone (SM) 60.0-61.2' - Same as 50.0-51.25' except 45-50% fine to coarse limestone fragments, 30% fine to coarse sand-sized, 20-25% low plastic fines Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log		Finished drilling at 17:48 on 4/17/07, setting HW casing to 61.0' below ground surface
	61.4		42-32-50/4.5 (82/10.5)			
65 -22.5						
70 -27.5						
75 -32.5						
80						



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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
61.5	R1-NQ 5 ft 86%	32	2	61.7' - Mechanical break	[Symbolic Log]	Limestone 61.5-65.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, extremely weak to weak (R0 to R2), rock strength increasing with depth, voids, to 3/16" over 20-30% of surface, moderately fossiliferous with casts to 1/4"-1/2", dissolution cavities to 1/2"x1" over 5-15% of surface, (dark possibly organic) material over 5-10% as of surface from 61.5-62.3' No Recovery 65.8-66.5'	Resume drilling at 07:45 at 4/18/07 with rock coring Water level is 2.5' below ground surface R1:2 minutes
65			4	62.0, 62.1, 62.65, 62.85, 63.15, 63.3, 63.75, 64.15, 65.4, 65.55' - Bedding plane or mechanical break (10), horizontal, smooth, undulating, tight to 1/8" open			
65			2	62.35' - Mechanical break			
65			1				
65			1				
66.5	R2-NQ 5 ft 91%	52	NR	66.5-66.8' - Fracture zone	[Symbolic Log]	Limestone 66.5-71.05' - Same as 61.5-65.8' except very weak to weak (R1 to R2), no dark/organic material, and all very weak to weak rock (R1 to R2) No Recovery 71.05-71.5'	Driller's Remark: Driller runs in 2nd gear at 350 psi R2:3 minutes
70			10	67.1, 68.4, 68.9, 69.6, 70.5' - Bedding plane or mechanical break (5), smooth, undulating, tight to 1/8" open			
70			3	69.1, 69.2, 69.85, 69.95, 70.4' - Bedding plane or mechanical break (5), rough, undulating, tight to 1/2" open			
70			6	70.15, 72.5, 72.75, 73.0, 75.05, 75.55' - Bedding plane or mechanical break (6), horizontal, smooth, undulating, tight			
70			1	70.35' - Fracture or mechanical break, rough, undulating			
71.5	R3-NQ 5 ft 98%	66	NR		[Symbolic Log]	Limestone 71.5-76.4' - Same as 61.5-65.8' except no dark, possibly organic material, dissolution cavities to 1"x1/2" over 5% surface, extremely weak rock (R0) from 72.2-72.6' and 72.9-73.4' and increasing to moderately strong rock (R3) with depth No Recovery 76.4-76.5'	R3:9 minutes
75			1	73.25, 73.6, 73.75' - Bedding plane or mechanical break (3), <10 deg, rough, undulating, tight, 1/2" open			
75			4	74.0' - Mechanical break			
75			2				
75			1				
76.5	R4-NQ 5 ft 64%	25	NR	76.6, 77.35, 77.55, 77.8, 78.4, 78.9, 79.9' - Bedding plane (7), horizontal, smooth, undulating, tight to 1/8" open	[Symbolic Log]	Limestone 76.5-77.35' - moderately yellowish brown to grayish orange, (10YR 5/4 to 10YR 7/4), medium grained, moderate HCl reaction, very weak to medium strong (R1 to R3), voids to 1/8" over 15-30% of rock, poorly fossiliferous with trace casts to 1/16" x3/16", trace dissolution cavities to 2"x1" No Recovery 76.4-76.5'	Driller's Remark: 50% loss of circulation at 78' R4:7 minute
80			2	77.8-78.15' - Fracture zone, fragments to 1"x2"			
80			3	78.25' - Fracture, 80 deg, smooth, undulating, open			
80			1	79.0' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/2"-1" open			
80			1	79.5' - Fracture, 80 deg, smooth, undulating, tight			
81.5			NR				



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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
85 -42.5	R5-NQ 5 ft 76%	28	3	81.55,82.55,83.3,84.0' - Bedding plane or mechanical break (4), horizontal, rough, undulating, 1/4" open to open		Limestone 77.35-79.1' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-20% of surface, poorly fossiliferous with trace fossil casts to 1/8"x1/8", dissolution cavities to 1"x1/2" (trace) 79.1-79.7' - Same as 76.5-77.35' No Recovery 79.7-81.5' Limestone 81.5-85.3' - Same as 79.1-79.7' No Recovery 85.3-86.5'	Driller's Remark: Void at 81.5-82.0 (dropped stem), 100% loss of circulation R5:5 minutes	
		10	81.95, 82.4, 83.15' - Bedding plane or mechanical break (3), 10-20 deg, rough, undulating, tight to 1/2" open					
		4	82.4-83.8, 83.3-83.8' - Fracture zone (2), fragments to 1"x3"					
		10	84.1' - rough, 2 intersecting near vertical fractures, undulating					
		NR	84.7-85.3' - Fracture zone, fragments to 1-1/2"x3", fractures at 70-90 deg					
86.5			10	86.5-86.65' - only recovered rock		Limestone 86.5-86.65' - Same as 79.1-79.7' No Recovery 86.65-91.5'		
90 -47.5	R6-NQ 5 ft 3%	0	NR			Limestone 91.5-94.1' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, medium strong (R3), voids to 1/16" over 5-10% of surface, trace fossil casts to 3/16", trace cavities to 1-1/2"x1/16", with poorly competent infill, silty layer at 91.9-92.0' and 92.5-92.65' 94.1-96.2' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 25% of surface, trace fossil casts to 1/4"x1/8", no visible cavities, silt layer (low plasticity) from 94.1-94.5' No Recovery 96.2-96.5' Limestone 96.5-101.5' - Same as 94.1-96.2' except trace cavities with light colored infill to 1"x1-1/2"	Driller's Remark: Core blockage caused no recovery for core run R6 R6:25 minutes	
91.5		10	91.65, 92.9, 94.05, 94.5' - Bedding plane (4), horizontal, smooth, undulating to planar, tight to 1/2" open					
		10	91.65-92.0' - Fracture zone, fragments to 1-1/2"x2", some silt infill					
		10	92.5-92.8' - Fracture zone, fragments to 1-1/2"x1-1/2", silt and coarse sand infill, 92.5-92.65'					
		1	93.25, 93.3, 93.55' - Fracture zone or mechanical break (3), 70 deg, undulating to stepped, smooth to rough					
95 -52.5	R7-NQ 5 ft 94%	44	1	93.5' - Fracture, 80 deg, smooth, undulating, dark staining, tight		R7:21 minutes		
		0	93.75' - Fracture, as above at 93.5' except 20 deg					
		NR	94.1-94.25' - Fracture zone					
		2	95.7' - Fracture, 40 deg, smooth, planar, silty infill, tight					
		0	96.55, 96.6' - Bedding plane (2), 0-10 deg, smooth, undulating to stepped, dark staining (possibly organics), infill, tight					
100 -57.5	R8-NQ 5 ft 100%	97	1	99.4' - Mechanical break or fracture, 30 deg, rough, undulating, tight to 1/4" open		R8:7 minutes		
		1	100.1' - Fracture, at 99.4' except very rough and undulating					
101.5			0					



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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
105 -62.5	R9-NQ 5 ft 90%	69	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 with no infill and trace fossil casts to 3/4"x1/4" No Recovery 106.0-106.5'	R9:7 minutes	
			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" open			
			3	103.25-103.3' - Fracture zone, fragments to 1/2"x1"			
			1				
			2				
106.5			NR				
110 -67.5	R10-NQ 5 ft 100%	68	1	107.1, 108.4, 108.7, 109.25, 109.65, 109.8, 110.3' - Bedding plane or mechanical break (7), horizontal, smooth, undulating, tight to 1/4" open	Limestone 106.6-111.5' - Same as 101.5-106.0' except percentage of voids decreasing with depth down to 5%	R10:6 minutes	
			1				
			3				
			4				
111.5			10	110.45-111.25' - Fracture zone, fragments to 2"x4", most at 40 deg			
115 -72.5	R11-NQ 5 ft 92%	46	>10	111.6-112.5' - Fracture zone, fragments to 2"x2", many horizontal bedding planes	111.5-116.5' - grayish orange, (10YR 7/4), fine to medium grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids to 1/16" over 5-20% of rock increasing in coverage with depth, trace fossil casts to 1/4"x1/8", wavy bedding planes from 111.5-112.6'	R11:6 minutes	
			1				
			1	113.5' - Bedding plane, horizontal, smooth, undulating, tight			
			10	114.7-114.9' - Fracture zone, fragments to 1-1/2"x2"			
			2				
116.5			NR	115.8' - Fracture or mechanical break, 10 deg, rough, undulating, tight to 1/4" open	No Recovery 116.1-116.5'	R11:6 minutes	
120 -77.5	R12-NQ 5 ft 84%	46	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"	Limestone 116.5-120.7' - pale yellowish orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), medium to coarse grained, strong HCl reaction, extremely weak to weak (R0 to R2), voids to 3/16" over 5-25% of rock, fossil casts to 1/2" diameter over 5% surface, trace cavities filled with dark material	Finish drilling on 4/18/07 at 17:00, at 116.5' Resume drilling at 07:20 on 4/19/07	
			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 smooth, undulating, open to 1/4" open, except 120.5' <10 deg			
			10				
			1				
121.5			NR		No Recovery 120.7-121.5'	R12:8 minutes	



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 2.5 ft bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS					
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION									
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS									
125 -82.5	R13-NQ 5 ft 94%	48	4	121.7-121.9' - Bedding plane, horizontal, smooth, planar to stepped, tight	[Symbolic Log]	Limestone 121.5-126.2' - Same as 116.5-120.7' except voids decreasing to 5% coverage with depth, highly fossiliferous from 121.5-124.4 with casts to 1/4"-1/2" over 15% of surface, solution cavities to 1/4"-1/2" over 5-7%, interval of fine grained moderately strong (R3) rock with distinct lamination and trace voids (up to 1/16") at 121.7-121.9'	R13:5 minutes						
			4	122.65, 122.7, 122.85, 123.0, 125.25' - Bedding plane or mechanical break (5), 0-5 deg, smooth, undulating, tight									
			2	124.4' - Fracture zone or mechanical break, 20 deg, smooth, undulating, tight									
			10	124.5' - Fracture, 80 deg, smooth, planar, tight									
			10	124.95' - Fracture, 30 deg, smooth, planar, tight									
			NR	125.25-125.6' - Fracture zone, fragments to 3"x1"									
			10	125.6' - Fracture, 65 deg, smooth, planar, open									
			4	125.9-126.0' - Fracture zone, fragments to 1"x1-1/2"									
			10	126.5-127.0' - Fracture zone, some dark staining, fragments to 2"x1"									
			130 -87.5	R14-NQ 5 ft 90%				26	127.0, 127.3, 127.45, 128.0, 128.2, 128.35, 129.25, 129.4, 130.7, 130.8' - Bedding plane or mechanical break (10), 0-5 deg, smooth, planar to undulating, tight	[Symbolic Log]	No Recovery 126.2-126.5' Limestone 126.5-131.0' - very pale orange, (10YR 8/2), fine to coarse grained, strong HCl reaction, extremely weak to very weak (R0 to R1), grain size becoming more coarse with depth, voids to 1/8" over 5-25% of surface, trace cavities to 1/2"x1" filled with light colored infill, poorly fossiliferous with trace casts to 1/4"	R14:4 minutes	
4	129.55, 129.95, 130.2' - Fractures, 50 deg, smooth, undulating to planar, tight to 1/4" open												
2	129.7' - Fracture, rough, undulating, near vertical, open												
NR	131.75, 131.8, 131.95, 132.0, 132.35, 132.45' - Bedding plane (6), horizontal, smooth, planar, tight												
10	131.85' - Fracture, vertical, smooth, planar												
2	132.55, 132.95, 134.45, 135.15, 135.35' - Bedding plane (5), horizontal, smooth, planar, tight												
10	133.85, 134.25' - Bedding plane or mechanical break (2), 0-10 deg, rough, undulating, 1/4" open												
5	134.35-134.55' - Fracture zone, fragments to 1"x2"												
1	134.65' - Fracture, 30 deg, smooth, planar, open												
NR	136.6' - Fracture or mechanical break, vertical, smooth, undulating, tight												
135 -92.5	R15-NQ 5 ft 84%	34	>10	136.75, 137.15, 137.55, 132.6, 138.05' - Bedding plane (5), horizontal, rough to smooth, undulating, many open (next to fracture zone)	[Symbolic Log]	135.05-135.7' - pale yellowish brown, (10YR 6/2), coarse grained, strong HCl reaction, voids to 1/8" over 5-30% of rock (variable), trace fossil casts and molds to 1/4"x1/8", trace dark laminations No Recovery 135.7-136.5' Limestone 136.5-138.4' - Same as 135.05-135.7' except 10% fossil casts and molds to 1/2" diameter, and color darkens to moderate yellowish brown with depth (10YR 5/4) 138.4-138.85' - Same as 121.7-121.9' except pale yellowish brown, (10YR 6/2) 138.85-139.65' - Same as 136.5-138.4'	R15:10 minutes						
			>10	137.15-137.55, 138.2-138.75, 139.65-139.8' - Fracture zone (3), fragment to 1-1/2"x1/2"									
			>10	138.2, 138.25, 138.4, 138.85, 139.25, 139.65' - Bedding plane (6), horizontal, rough to smooth, undulating, many open (next to fracture zone)									
			10	138.4-138.7' - Fracture zone, many bedding planes horizontal									
			NR										
			140 -97.5	R16-NQ 5 ft 78%				38	10		[Symbolic Log]		R16:7 minutes
			NR										
			NR										
			NR										
			141.5										



PROJECT NUMBER: 338884.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 bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
145 -102.5	R17-NQ 5 ft 88%	36	2	140.2' - Mechanical break or bedding plane, 5 deg, rough, undulating, 1/4" open	[Symbolic Log]	Limestone 139.65-140.4' - yellowish gray with moderate yellowish brown infill, (5Y 7/2 with 10YR 5/4), fine grained, strong HCl 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 HCl reaction No Recovery 140.4-141.5' Limestone 141.5-144.25' - Same as 139.65-140.4'	R17:11 minutes	
			4	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				
			>10	143.65' - Fracture zone, as 141.7' except dark stain and tight				
			10	143.85-144.25' - Bedding plane, horizontal, smooth, undulating, open				
			1	144.4, 144.8, 144.9, 145.0, 145.8' - Bedding plane (5), horizontal, smooth				
150 -107.5	R18-NQ 5 ft 88%	50	NR	144.4-144.9' - Fracture zone, fragments to 1"x1/2"	[Symbolic Log]	146.5-146.55' - Fracture zone, fragments to 1"x1/2" 146.55, 147.5, 148.6, 148.7, 149.1, 149.3, 149.35, 149.45, 149.7, 148.75, 150.5, 150.7' - Bedding plane, 10 deg, smooth, undulating, 1/2" open	R18:8 minutes	
			10	150.1' - Mechanical break, (by drillers)				
			10	150.7' - Fracture, vertical, rough, undulating, tight				
			4					
			3					
155 -112.5	R19-NQ 5 ft 84%	46	NR		[Symbolic Log]	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, 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), 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 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 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' 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 colored, fine grained, medium strong (R3) rock layer at 157.05' No Recovery 159.4-161.5'	R19:7 minutes	
			>10					
			>10					
			10					
			1					
160 -117.5	R20-NQ 5 ft 58%	33	0		[Symbolic Log]		R20:5 minutes	
			NR					
			10	156.5-156.8, 159.1-159.3' - Fracture zone (2), fragments to 2"x1"				
			1	156.8, 157.05, 157.2, 157.4, 158.2, 159.1' - Bedding plane, horizontal, smooth, planar to undulating, tight except adjacent to fracture zone				
161.5								



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-06	SHEET 10 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 bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT	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.	
165 -122.5	R21-NQ 5 ft 80%	19	10	161.5-161.7' - Fracture zone, dark staining, fragments to 1/2" thick, all bedding planes at horizontal	[Symbolic Log]	Limestone 161.5-162.5' - Same as 156.5-159.3' and 146.5-150.9' except pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, medium strong to weak (R3 to R2), 5-15% voids <1/16", trace cavities <1/4"	R21:8 minutes		
			10	162.25, 163.15, 163.4, 163.55, 165.05, 165.4' - Bedding plane (6), horizontal, smooth, undulating to planar, some with dark staining, tight except next to fracture zone					
			10	162.45' - Fracture or mechanical break, <10 deg, rough, undulating, 1/2" open					
			10	162.6-162.85' - Fracture zone, some dark staining, parallel 45 deg fractures, tight					
			NR	162.7' - Fracture, 70 deg, smooth, undulating, dark staining, tight					
	170 -127.5	R22-NQ 5 ft 90%	17	>10		163.65' - Fracture, 70 deg, smooth, planar, dark staining, tight	[Symbolic Log]	162.5-165.5' - Same as 144.25-145.9' except grayish orange to pale yellowish brown, (10YR 7/4 o 10YR 6/2), very fine to fine grained, moderate HCl reaction, strong (R4), 5% coverage of voids (<1/16"), increasing to 15% with depth No Recovery 165.5-166.5' Limestone 166.5-168.5' - Same as 161.5-162.5'	R22:6 minutes
				>10		164.0-165.05' - Fracture zone, fragments to 3"x1"			
				>10		166.5-167.5, 168.2-168.5, 169.2-164.65, 170.35-170.55' - Fracture zone (4), fragments to 4"x1-1/2"			
				>10		167.65, 168.65' - Fractures (2), rough, undulating, no stain or infill, tight			
				1		168.2, 168.5, 168.85, 169.2, 169.8, 170.35, 178.55' - Bedding plane (7), horizontal, rough to smooth, undulating to planar, no stain or infill, tight except next to fracture zone			
175 -132.5	R23-NQ 5 ft 98%	72	3	169.75, 170.3' - Fractures (2), 70 deg, smooth, undulating, little dark staining, open and tight respectively	[Symbolic Log]	No Recovery 171.0-171.5' Limestone 171.5-176.4' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 5-20% surface (variable), trace fossil casts to 1/4"x1/2", trace cavities to 1"x1/2"	R23:7 minutes		
			3	171.55, 172.05, 172.1, 172.65, 173.2, 173.4, 173.5, 173.9, 175.55, 176.0, 176.1, 176.35' - Bedding plane (12), horizontal, smooth, undulating to planar, some with dark staining, tight except by fracture zone					
			>10	173.5-173.9, 176.35-176.4' - Fracture zone (2), fragments to 2"x2"					
			0						
			4						
	180 -137.5	R24-NQ 5 ft 93%	36	NR			[Symbolic Log]	No Recovery 176.4-176.5' Limestone 176.5-181.15' - Same as 171.5-176.4' except trace dark laminations at 177.4-177.7' and cavities to 1/2" diameter over 10% of rock from 180.5-180.95'	R24:8 minutes
				7		173.5-173.9, 170.35-176.4, 176.6, 176.9, 177.0, 177.3, 177.4, 177.6, 178.6, 178.65, 179.5, 179.8, 179.85, 180.25, 180.35, 180.75' - Bedding plane (15), horizontal, smooth, undulating to planar, few with dark stains, tight except on fracture zones			
				2		176.95' - Fracture, vertical, smooth, undulating, tight			
				3		177.1' - Fracture, 80 deg, smooth, undulating, open			
				10		177.9' - Fracture, 25 deg, rough, undulating, tight			
181.5	NR	NR	2	178.85' - Fracture, horizontal, same as 177.9' except horizontal	[Symbolic Log]	No Recovery 181.15-181.5'			
			NR	179.65' - same as 177.1' except rough					



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-06	SHEET 11 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 bgs on 4/17/07 START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
185 -142.5	R25-NQ 5 ft 100%	62	3	180.3' - Fracture, same as 179.65' 180.4-180.8' - Fracture zone, fragments to 2"x2"	Limestone 181.5-185.0' - Same as 176.5-181.15' except layer of medium strong (R3) rock at 183.1-183.65' 185.0-186.5' - pale yellowish brown, (10YR 6/2), coarse grained, moderate HCl reaction, medium strong (R3), voids to 1/16" over 15-25% of surface, fossil casts to 3/4"x1/2" over 20% of surface Bottom of Boring at 186.5 ft bgs on 4/19/2007	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. R25:9 minutes Total depth of boring is 186.5'	
		5	182.15' - Fracture, 20 deg, smooth, undulating, tight				
		1	182.3, 182.35, 182.6, 182.65, 183.05, 183.15, 183.65, 184.6, 184.7, 184.8' - Bedding plane (10), horizontal, smooth, undulating to planar, some dark staining, tight except by fracture zone				
		10	183.0' - Fracture, 80 deg, rough, undulating, open				
		0	184.6-184.85' - Fracture zone, fragments to 1-1/2"x2" 185.3, 185.4' - Fractures (2), 30 deg and 20 deg, rough, undulating				
186.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07	SHEET 1 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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
42.7	0.0	1.1	SS-1	1-3-4 (7)	Topsoil (OL) 0-0.2' - grayish black, (N2), moist, organic matter with 20% fine silica sand Poorly Graded Sand With Organics (SP) 0.2-1.1' - brownish gray to grayish black, (5YR 4/1 to N2), moist, loose, fine silica sand with 40% organic fines, decreasing to 10% with depth		Began at 8:37 on 4/20/07
	1.5						
5 37.7	5.0	1.2	SS-2	2-1-1 (2)	Silty Sand (SM) 5.0-6.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very loose, no HCl reaction, fine silica sand with 30% nonplastic fines		
	6.5						
10 32.7	10.0	0.4	SS-3	0-0-0 (0)	Fat Clay (CH) 10.0-10.35' - grayish blue, (5PB 5/2), moist, very soft, high plasticity, no dilatancy, no HCl reaction, 10% fine silica sand		
	11.5						
15 27.7	15.0	0.8	SS-4	4-5-3 (8)	Silt (ML) 15.0-15.8' - grayish yellow, (5YR 8/4), wet, medium stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand, carbonate materials, trace organics, 1/16" thick gray layer at 15.2'		
	16.5						
20							



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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
22.7	20.0	1.3	SS-5	3-3-3 (6)	Silt (ML) 20.0-21.3' - Same as 10.0-10.35' except greenish gray, (5G 6/1), medium stiff, no HCl reaction, with light olive yellow mottling (5Y 5/6) in 15-20% of silt, three concretions to 1"x1/4" between 20.0-20.5'		
	21.5						
25	25.0	1.3	SS-6	2-2-2 (4)	Sandy Fat Clay (CH) 25.0-26.3' - light olive gray, (5YR 6/1), with mottling from 25.0-25.3', moist, soft, high plasticity, no dilatancy, no HCl reaction, 30% fine silica sand, one coarse gravel-sized silica sand concretion		
17.7	26.5						
30	30.0	1.5	SS-7	2-4-7 (11)	Organic Soil (OH) 30.0-31.5' - olive black, (5Y 2/1), moist, stiff, medium to high plasticity, slow dilatancy, no HCl reaction, 5-10% fine silica sand, fine silica sand lens from 30.45-30.55'		
12.7	31.5						
35	35.0	1.0	SS-8	3-5-3 (8)	Organic Soil (OH) 35.0-36.0' - olive gray, (5Y 4/1), wet, medium stiff, medium to high plasticity, slow dilatancy, no HCl reaction, 40% fine silica sand		
7.7	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07	SHEET 3 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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.7	40.0	1.1	SS-9	6-6-7 (13)	[Symbolic Log Pattern]		
	41.5						
45	45.0	1.4	SS-10	3-5-6 (11)	[Symbolic Log Pattern]		
-2.3	46.5						
50	50.0	1.2	SS-11	6-16-20 (36)	[Symbolic Log Pattern]		
-7.3	51.5						
55	55.0	1.3	SS-12	18-28-50/3 (78/9")	[Symbolic Log Pattern]		
-12.3	56.3						
60							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07	SHEET 4 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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-17.3	60.0	1.0	SS-13	17-42-50/5 (92/11")	[Symbolic Log Pattern]	
	61.4					
65	65.0				[Symbolic Log Pattern]	
-22.3	66.5	1.5	SS-14	5-10-14 (24)		
70	70.0				[Symbolic Log Pattern]	At 13:35 water level is 1.25' below ground surface
-27.3	71.5	1.5	SS-15	6-6-5 (11)		
75	75.0				[Symbolic Log Pattern]	
-32.3	76.5	1.1	SS-16	2-4-10 (14)		
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07	SHEET 5 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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
				0"-0"-0" (0)			
-37.3	80.0	1.0	SS-17	10-28-16 (44)	Silt (ML) 80.0-81.0' - grayish orange, (10YR 7/4), wet, hard, low plasticity, rapid dilatancy, moderate HCl reaction, trace coarse gravel-sized limestone fragment, carbonate materials, 1/8" thick dark layer at 80.3'		
	81.5						
85	85.0	1.2	SS-18	0-0-0 (0)	Sandy Organic Soil (OH) 85.0-86.2' - olive black, (5Y 2/1), wet, very soft, medium to high plasticity, slow dilatancy, no HCl reaction, 30-40% fine silica sand		
-42.3	86.5						
90	90.0	1.3	SS-19	0-0-0 (0)	Sandy Organic Soil (OH) 90.0-91.3' - Same as 85.0-86.2' except 5-50% sand decreasing with depth		
-47.3	91.5						
95	95.0	0.6	SS-20	25-50/5 (75/11")	Silt With Limestone Fragments (ML) 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 interbeds		
-52.3	95.9						
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07	SHEET 6 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
 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 : 1.25 ft bgs on 4/20/07 START : 4/20/2007 END : 4/20/2007 LOGGER : C. Wallestad

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-57.3	100.0	0.4	SS-21	50/6 (50/6")	Silt (ML) 100.0-100.4' - grayish orange, (10YR 7/4), moist, hard, low plasticity, slow to rapid dilatancy, moderate HCl reaction, carbonate material, organic soil layers 3/16" thick at 100.1' and 100.3' Bottom of Boring at 100.5 ft bgs on 4/20/2007		Finished drilling/sampling at 15:30 on 4/20/07 Total depth of boring 100.5' Surface collapse; filled with grout
105 -62.3							
110 -67.3							
115 -72.3							
120							



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
 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 : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
43.1	0.0	1.1	SS-1	1-2-3 (5)	Poorly Graded Sand With Organics (SP) 0.0-1.1' - brownish black to brownish gray, (5YR 2/1 to 5YR 4/1), moist, loose, fine silica sand, 20% organic material decreasing with depth		4/21/07 at 07:55 start SPT
	1.5						
5	5.0	1.1	SS-2	2-2-3 (5)	Silty Sand (SM) 5.0-6.1' - moderate yellowish brown to grayish orange, (10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots		
38.1	6.5						
10	10.0	1.1	SS-3	3-8-10 (18)	Silt (ML) 10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate		
33.1	11.5						
15	15.0	0.3	SS-4	50/5 (50/5")	Silt (ML) 15.0-15.3' - Same as 10.0-11.1' except hard		
28.1	15.4						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07A	SHEET 2 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
 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 : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
23.1	20.0	0.9	SS-5	5-10-15 (25)		
	21.5					
25	25.0	0.9	SS-6	10-20-23 (43)		
18.1	26.5					
30	30.0	0.2	SS-7	50/4 (50/4")		
13.1	30.3					
35	35.0	0.3	SS-8	50/4 (50/4")		HW casing set at 35 ft below ground surface
8.1	35.3					
	40.0	0.1	SS-9	50/2 (50/2")		
	40.2					
40						
				Begin Rock Coring at 40.0 ft bgs See the next sheet for the rock core log		



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
3.1	40.0 R1-NQ 1 ft 85%	0	1	40.6' - Fracture, 70 deg, smooth, undulating to stepped, tight	Limestone 40.0-40.85' - light olive gray, (5Y 5/2), medium to coarse grained, strong HCl reaction, weak (R2), mottled with grayish orange (10YR 7/4), voids to 1/8" over 15-25% of surface, trace cavities to 1"x1/4", trace fossils to 1/2"x1/4" No Recovery 40.85-41.0' Limestone 41.0-43.7' - light olive gray, (5Y 5/2), fine to coarse grained, weak to moderate HCl reaction, extremely weak (R0), poorly competent, trace voids to 1/16", unconsolidated sandy silt from 42.5-43.55' No Recovery 43.7-46.0'	R1:2 minutes	
41.0			NR	41.0-41.4' - Fracture zone, fragments to 2"x1"			
45	R2-NQ 5 ft 54%	0	0	41.75' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight		R2:2 minutes	
-1.9			NR				
46.0			N/A		Sandy Silt (ML) 46.0-48.25' - moderate yellowish brown, (10YR 5/4), wet, medium grained, strong HCl reaction, carbonate silt with 20-50% carbonate		
			N/A				
	R3-NQ 5 ft 94%	24	>10	48.95, 49.05' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight to 1/4" open	Limestone 48.25-50.7' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, moderate HCl reaction, highly competent, voids to 1/8" over 15-45% of rock, trace fossil casts to 3/16" diameter No Recovery 50.7-51.0' Limestone 51.0-56.0' - grayish orange, (10YR 7/4), fine to coarse grained, moderate to weak HCl reaction, extremely weak to weak (R0 to R2), voids to 1/8" over 10-40% of rock, trace fossils to 1/8" diameter, extremely weak, fine grained rock at 53.5-54.2' and 55.4-55.6', voids over 10-15% of surface, 25-30% dark laminations 1/16"-3/16" thick	R3:3 minutes	
50			4	49.0' - Fracture or mechanical break, vertical, smooth, planar, open			
-6.9			3	49.8, 50.1' - Fractures (2), 60 deg, rough, undulating, tight			
			NR	50.15' - Fracture, 30 deg, rough, undulating, tight			
			0	50.4' - Fracture, 80 deg, rough, undulating, tight	Limestone 51.0-56.0' - grayish orange, (10YR 7/4), fine to coarse grained, moderate to weak HCl reaction, extremely weak to weak (R0 to R2), voids to 1/8" over 10-40% of rock, trace fossils to 1/8" diameter, extremely weak, fine grained rock at 53.5-54.2' and 55.4-55.6', voids over 10-15% of surface, 25-30% dark laminations 1/16"-3/16" thick	R4:4 minutes	
	R4-NQ 5 ft 100%	11	3	50.5' - Fracture, 50 deg, rough, undulating, tight			
55			1	52.1, 52.5, 52.85, 53.98, 54.2, 54.75, 55.4' - Bedding plane or mechanical break (7), horizontal and 10 deg, smooth, undulating, tight			
-11.9			2	52.1, 52.5, 52.85, 53.98, 54.2, 54.75, 55.4' - Bedding plane or mechanical break (7), horizontal and 10 deg, smooth, undulating, tight			
			1				
			N/A		56.0-56.3' - Same as 51.0-56.0'		
			1		Silt (ML) 56.3-57.7' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, extremely weak (R0), grading to extremely weak (R0) limestone, thinly bedded with 1/16" thick, dark laminations (possible organics) over 25% of surface		
	R5-NQ 5 ft 98%	34	0	57.4, 59.15' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/4" open			
			1		Limestone 57.7-59.7' - Same as 51.0-56.0'		
60			1				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07A	SHEET 4 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-16.9			N/A		Silt (ML) 59.7-60.3' - grayish orange, (10YR 7/4), strong HCl reaction, extremely weak (R0), grading to extremely weak (R0) limestone, thinly bedded with 1/16" thick, dark laminations (possible organics) over 25% of surface	R5:5 minutes	
61.0	R6-NQ 5 ft 98%	84	NR	1 61.5, 65.8' - Bedding plane or mechanical break (2), 20 deg, smooth, undulating to planar 2 62.3' - Bedding plane or mechanical break, horizontal, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5 deg, smooth, undulating to planar	Limestone 60.3-60.9' - Same as 51.0-56.0' No Recovery 60.9-61.0' Limestone 61.0-61.4' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCl reaction, very weak to weak (R1 to R2), competent, voids to 1/8" over 5-15% of rock, trace cavities to 1.0' diameter most filled with extremely weak rock (R0), few open, trace dark laminations	R6:9 minutes	
65 -21.9			N/A	1	Silt (ML) 61.4-62.6' - poorly competent as 56.3-57.7'		
66.0	R7-NQ 5 ft 100%	57	NR	2 66.15, 66.8' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/4" open 1 68.85' - Fracture or mechanical break, 20 deg, rough, undulating to stepped, tight 69.5, 70.4' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/4" open	Limestone 62.6-64.8' - pale yellowish brown, (10YR 6/2), fine to coarse grained, moderate HCl reaction, very weak to weak (R1 to R2), competent, voids to 1/8" over 5-15% of rock, trace cavities to 1.0' diameter most filled with extremely weak rock (R0), few open, trace dark laminations (possible organics)	R7:3 minutes	
70 -26.9				1	Silt (ML) 64.8-65.9' - poorly competent as 56.3-57.7' No Recovery 65.9-66.0' Limestone 66.0-71.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, extremely weak to weak (R0 to R2), voids to 1/16" over 0-25% of rock, trace fossil casts, trace dark laminations, extremely weak from 66-66.6', 67.3-68.3', and 69.1-71.0'		
71.0	R8-NQ 5 ft 100%	70		1 71.1, 73.55, 73.8' - Bedding plane or mechanical break (3), horizontal, smooth, undulating to planar, 1/16" thick infill of fines infill, tight 2 72.05' - Fracture, 55 deg, rough, undulating, tight 10 72.55' - Fracture, 70 deg, rough, undulating, tight 10 73.8-74.3' - Fracture zone	71.0-72.6' - Same as 66.0-71.0' except extremely weak (R0) 72.6-73.5' - moderate yellowish brown, (10YR 5/4), coarse grained, moderate HCl reaction, weak to medium strong (R2 to R3), competent, voids to 3/16" over 15-30% of rock, fossil casts to 3/16"x3/8" over 5-15% of rock, trace cavities to 1/4"x1.5', trace dark material (possible organics) 73.5-74.4' - Same as 71.0-72.6'	R8:6 minutes	
75 -31.9				1			
76.0	R9-NQ 5 ft 96%	77		0 77.25, 78.1' - Bedding plane or mechanical break (2), 85 deg, smooth, planar, tight 1 78.7' - Fracture, 30 deg, rough, undulating, tight 2 79.25-79.85' - Fracture zone, fragments to 1" diameter			
80				1			



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-36.9			>10	79.75, 79.85' - Mechanical break or fractures (2), horizontal, rough, undulating, associated with dissolution cavity, open		Limestone 74.4-76.0' - moderate yellowish brown, (10YR 5/4), coarse grained, moderate HCl reaction, weak to medium strong (R2 to R3), competent, voids to 3/16" over 15-30% of rock, fossil casts to 3/16"x3/8" over 5-15% of rock, trace cavities to 1/4"x1.5", trace dark material (possible organics) 76.0-77.25' - Same as 74.4-76.0' except voids decreasing with depth 77.25-78.1' - Same as 56.3-57.7' except trace dark laminations (possible organics) 78.1-79.6' - dark yellow orange to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 20-45% of rock, trace fossil casts 1/4" diameter, trace cavities to 1"x2" with competent, medium strong rock (R3) infill 79.6-80.8' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), moderate HCl reaction, medium strong (R3), competent, voids to 3/16" over 0-35% of rock, cavities to 3"x1" over 25-30% of rock, cavities partially filled with weak rock infill, trace fossil casts to 1/2"x1/4"	R9:8 minutes	
81.0			NR	80.4' - Fracture, 75 deg, rough, associated with dissolution cavity, open				
			>10	81.0-81.05, 81.55-81.95' - Fracture zone (2), fragments 1.5"x2"				
			2	81.05, 81.55, 81.95' - Bedding plane or mechanical break (3), horizontal, rough, undulating, open by fracture zones				
	R10-NQ 5 ft 85%	43	3	81.45' - Fracture or mechanical break, 40 deg, rough, undulating, tight to 1/4" open				
			4	82.1, 83.6' - Bedding plane or mechanical break (2), rough, undulating, tight to 1/4" open				
85			0	82.8' - Fracture or mechanical break, 30 deg, smooth, planar, tight				
-41.9			NR	83.45' - Fracture or joint, 60 deg, undulating, as 81.5'				
			2	84.25' - Bedding plane, <10 deg, smooth, undulating, apparently along possible organic layer, tight				
			10	84.85' - Fracture or mechanical break, 40 deg, rough, undulating, 1/4" open				
	R11-NQ 5 ft 87%	51	2	85.0' - 20 deg				
			10	86.2, 87.35, 88.9, 89.7' - Bedding plane or mechanical break (4), horizontal, smooth, undulating to planar, tight except for fracture zone				
90			10	86.45, 86.65' - Fractures or mechanical break (2), 50 deg, rough, undulating, tight to 1" open				
-46.9			NR	87.2' - Fracture or mechanical break, 20 deg, smooth, undulating, open by fracture zone				
			2	87.2-87.35, 89.7-90.35' - Fracture zone (2), 20 deg, up to 2"x3" diameter				
			2	88.75' - Fracture, 85 deg, smooth, undulating				
	R12-NQ 5 ft 74%	28	10	89.0' - Fracture, 50 deg, smooth, undulating				
			10	91.6' - Fracture, 20 deg, smooth, planar, tight				
			10	91.65' - Fracture, 70 deg, smooth, undulating, tight				
95			NR	92.55' - Fracture, 35 deg, smooth, planar, tight				
-51.9			NR	92.65' - Fracture, 60 deg, smooth, planar, tight				
			NR	93.05' - Fracture, 60 deg, smooth, undulating, tight				
			NR	93.2' - Fracture, 80 deg, smooth, undulating, tight				
			>10	93.55' - Fracture or mechanical break, 20 deg, rough, undulating, 1/16"-3/16" open				
			10	93.55-94.25' - Fracture zone, fragments to 1.5"x2.5", infill in cavities				
	R13-NQ 5 ft 70%	15	3	94.25' - Bedding plane, horizontal, smooth, planar, open				
			4	96.0-96.75' - Fracture zone, dark, fragments to 3"x1", stain on many faces				
100				96.75' - Bedding plane, horizontal, smooth, planar, tight				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07A	SHEET 6 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-56.9			NR	97.1' - Fracture, 85 deg, smooth, undulating, dark, tight		93.55-94.7' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, medium strong (R3), competent, voids to 1/8" over 0-15% of surface, trace cavities to 1/4" diameter, tight plastic clay infilling in some cavities	R13:9 minutes	
101.0	R14-NQ 5 ft 34%	9	NR	97.15-97.25' - Bedding plane, horizontal, smooth, planar, 1" thick silt, tight 97.35' - Fracture, 75 deg, smooth, undulating, dark, tight 97.6-97.7' - Fracture zone, fragments to 1"x3/4"			No Recovery 94.7-96.0' Limestone 96.0-97.2' - very pale orange, (10YR 8/2), fine grained, moderate HCl reaction, medium strong (R3), voids to 1/16" over 0-10% of surface, dark staining on broken face 97.2-97.7' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, extremely weak to weak (R0 to R2), competent, voids to 1/16" over 10-20% of rock, moderately fossiliferous with casts and molds to 3/16"x3/8", trace dark inclusions 97.7-98.9' - dark yellow orange to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), competent, voids between 1/16"-1/8" over 30%, few secondary cavity infilling up to 1/2", strong HCl reaction on infilling (similar to 78.1-79.6')	07:55 water level = 2.5' below ground surface NW casing set at 101 ft below ground surface No recovery at 101.0-104.3 due to core barrel blockage
105			>10	98.5' - Fracture, 20 deg, rough, undulating, tight 98.85' - Fracture, 70 deg, smooth, undulating, dark, tight 98.9, 99.0' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight 99.15' - Fracture, 20 deg, rough, undulating, tight		98.9-99.5' - Same as 96.0-97.2' No Recovery 99.5-104.3' Limestone 104.3-105.7' - grayish orange, (10YR 7/4), fine grained, moderate to strong HCl reaction, medium strong (R3), medium strong (R3) at 105.4', voids up to 1/16" over 0-30% (mostly 0-5%) of surface, trace dark laminations 3/16" thick 105.7-106.0' - fine to medium grained, moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), very weak rock at 105.75', voids up to 1/16" over 5-15% of rock, trace dark inclusions 106.0-109.3' - grayish orange, (10YR 7/4), medium to coarse grained, weak to strong HCl reaction, extremely weak to weak (R0 to R2), poorly competent, voids to 1/8" over 25% of surface, fossil casts to 3/4"x1/4" over 3-12% of surface, trace dark mottling No Recovery 109.3-111.0' Limestone 111.0-115.7' - Same as 106.0-109.3' No Recovery 115.7-116.0' Limestone 116.0-119.1' - Same as 106.0-109.3'		R14:10 minutes
-61.9			3	99.3' - Fracture, 40 deg, smooth, undulating, dark, tight 99.8' - Fracture, 75 deg, smooth, undulating, open			104.3-104.7' - Fracture zone, dark staining on some faces, fragments to 3/4"x1.5" 104.7, 104.9, 105.0, 105.15' - Mechanical break (4), horizontal, smooth, undulating 104.95' - Fracture or mechanical break, 40 deg, smooth, planar, dark, tight 105.2' - Bedding plane, horizontal, smooth, planar, dark, open 105.4, 105.75' - Mechanical break (2) 105.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open 106.25, 107.2, 109.2' - Fractures (3), 80 deg, smooth, undulating, dark, open (missing opposite face)	R15:4 minutes
110	R15-NQ 5 ft 66%	0	>10	104.3-104.7' - Fracture zone, dark staining on some faces, fragments to 3/4"x1.5" 104.7, 104.9, 105.0, 105.15' - Mechanical break (4), horizontal, smooth, undulating 104.95' - Fracture or mechanical break, 40 deg, smooth, planar, dark, tight 105.2' - Bedding plane, horizontal, smooth, planar, dark, open 105.4, 105.75' - Mechanical break (2) 105.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open 106.25, 107.2, 109.2' - Fractures (3), 80 deg, smooth, undulating, dark, open (missing opposite face)				
-66.9			0	105.4, 105.75' - Mechanical break (2) 105.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open 106.25, 107.2, 109.2' - Fractures (3), 80 deg, smooth, undulating, dark, open (missing opposite face)		106.4-107.1, 107.5-109.0' - Fracture zone (2), fragments to 3"x2", some dark staining on faces in lower interval 109.0' - Fracture, 20 deg, smooth, undulating, dark, missing opposite face 111.0-111.15' - Fracture zone, fragments to 1"x1/4"	R15:3 minutes	
110			NR	106.4-107.1, 107.5-109.0' - Fracture zone (2), fragments to 3"x2", some dark staining on faces in lower interval 109.0' - Fracture, 20 deg, smooth, undulating, dark, missing opposite face 111.0-111.15' - Fracture zone, fragments to 1"x1/4"				
115	R16-NQ 5 ft 94%	46	10	106.4-107.1, 107.5-109.0' - Fracture zone (2), fragments to 3"x2", some dark staining on faces in lower interval 109.0' - Fracture, 20 deg, smooth, undulating, dark, missing opposite face 111.0-111.15' - Fracture zone, fragments to 1"x1/4"		111.15' - Mechanical break or bedding plane, horizontal, rough, undulating, open (missing opposite face) 111.35' - Fracture, 80 deg, rough, undulating, tight 113.25-113.6' - Fracture zone, fragments up to 2" in diameter 113.25, 113.6' - Bedding plane or mechanical break (2), smooth, undulating, open (missing opposite face) 113.95, 114.1' - Fractures (2), 45 deg and 35 deg, tight to 1" open 114.6' - Bedding plane or mechanical break, smooth, undulating, tight to 1/4" open 114.85' - Fracture, 80 deg, rough, undulating, dark, stain 115.35-115.7' - Fracture zone, fragments to 2"x2"	R16:3 minutes	
-71.9			3	111.15' - Mechanical break or bedding plane, horizontal, rough, undulating, open (missing opposite face) 111.35' - Fracture, 80 deg, rough, undulating, tight 113.25-113.6' - Fracture zone, fragments up to 2" in diameter 113.25, 113.6' - Bedding plane or mechanical break (2), smooth, undulating, open (missing opposite face) 113.95, 114.1' - Fractures (2), 45 deg and 35 deg, tight to 1" open 114.6' - Bedding plane or mechanical break, smooth, undulating, tight to 1/4" open 114.85' - Fracture, 80 deg, rough, undulating, dark, stain 115.35-115.7' - Fracture zone, fragments to 2"x2"				
115			>10	113.25-113.6' - Fracture zone, fragments up to 2" in diameter 113.25, 113.6' - Bedding plane or mechanical break (2), smooth, undulating, open (missing opposite face) 113.95, 114.1' - Fractures (2), 45 deg and 35 deg, tight to 1" open 114.6' - Bedding plane or mechanical break, smooth, undulating, tight to 1/4" open 114.85' - Fracture, 80 deg, rough, undulating, dark, stain 115.35-115.7' - Fracture zone, fragments to 2"x2"		116.6' - Fractures (2), 80 deg, smooth, undulating, intersecting, tight		
120	R17-NQ 5 ft 100%	90	NR	116.6' - Fractures (2), 80 deg, smooth, undulating, intersecting, tight				



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-76.9			0	116.75' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight	Limestone 119.1-119.5' - yellowish gray, (5Y 7/2), weak HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 0-20% of surface, trace cavities to 1.5"x1/4" with no infilling 119.5-121.0' - Same as 106.0-109.3' 121.0-123.55' - Same as 116.0-121.0' except increased fossil casts with depth, voids up to 1/2"x1/4" over 5-10% of rock 123.55-123.85' - Same as 119.1-119.5' except fossil casts/molds to 1/2"-1/4" over 5% of rock, trace cavities filled with clay, tight, many voids infilled 123.85-125.95' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, moderate HCl reaction, weak (R2), voids to 1/16" over 30-40% of rock, no visible fossils or cavities No Recovery 125.95-126.0' Limestone 126.0-127.7' - Same as 123.85-123.95' except extremely weak to medium strong rock (R0 to R3), mostly weak rock, moderately fossiliferous with echinoderm molds to 1/2"x1/4" at 126.3-127.7', trace fossil molds throughout entire run 127.7-128.0' - Same as 104.3-105.7' 128.0-130.5' - Same as 126.0-127.7' No Recovery 130.5-131.0' Limestone 131.0-134.9' - Same as 126.0-130.5' except moderately fossiliferous from 132.6-133.8' with casts to 1/2"x1/4" over 5-10% of rock, bigger voids and coarser texture with depth, thick rock as at 104.3-105.7' and 134.0-134.8' No Recovery 134.9-136.0' Limestone 136.0-137.0' - pale olive, (10YR 6/2), fine to medium grained, weak HCl reaction, medium strong (R3), competent, trace voids to 1/16", trace cavities on interbeds to 1/2" thick with increased percentage of voids to 3/16" over 30-60% infill	R17:5 minutes	
121.0			1	116.9' - Fracture or mechanical break, 60 deg, smooth, undulating, tight			
	R18-NQ 5 ft 99%	99	0	118.95' - Bedding plane or fracture, 20 deg, smooth, undulating, tight			
			1	119.5' - Bedding plane, horizontal, smooth, undulating, tight			
			0	121.6, 122.6, 125.5' - Bedding plane (3), horizontal, smooth, undulating, tight			
125			0				
-81.9			1				
	R19-NQ 5 ft 90%	58	2	126.3, 126.9, 127.1 127.65, 127.7, 127.95, 128.0, 128.4, 128.45, 129.65' - Bedding plane (10), horizontal, smooth, undulating to planar, mostly tight except at fracture zones			
			10	127.65-127.7, 128.4-128.95' - Fracture zone or bedding plane (2), horizontal, fragments to 1/2"x1/4"			
			>10				
130			0	129.65-129.95' - Bedding plane, horizontal, smooth, undulating to planar, mostly tight except by fracture zones			
-86.9			NR				
	R20-NQ 5 ft 78%	42	1	131.05, 132.1, 132.3, 133.8, 133.95, 134.2, 134.3, 134.4, 134.65' - Bedding plane (9), horizontal, smooth to rough, undulating to planar, tight except by fracture zones and where missing opposite face			
			10	132.05, 134.65' - Fractures (2), 60 deg, rough to smooth, undulating to planar			
			10	132.5-132.65, 133.8-133.95, 134.2-134.3, 134.65-134.8' - Fracture zone (4), fragments to 1.25"x1/2"			
			>10	134.2' - Bedding plane, horizontal, smooth to rough, undulating to planar, tight except by fracture zones where missing opposite face			
135			NR				
-91.9							
	R21-NQ 5 ft 82%	42	1	136.0-136.75' - Fracture zone or bedding plane, horizontal, fragments up to 1"x2"			
			>10	136.75, 136.95, 137.0, 137.2, 137.45, 137.55, 137.75, 138.1' - Bedding plane (8), horizontal, smooth, planar, tight			
			5	137.3, 138.5' - Mechanical break (2)			
			1				
140							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-96.9			NR	139.85' - Fracture, 70 deg, rough, undulating, tight		Limestone 137.0-138.1' - grayish orange, (10YR 7/4), medium to coarse grained, weak HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 15-40% of surface, trace fossil casts	R21:8 minutes	
141.0			10	141.3' - Fracture, 80 deg, smooth, undulating, tight		141.0-141.75' - Same as 138.1-140.1' Limestone 141.0-141.75' - Same as 138.1-140.1' 141.75-145.2' - light olive gray with pale orange mottling, (5Y 6/1 with 10YR 8/2), fine grained, strong HCl reaction, medium strong (R3), (possible preferential flow path, oxidation/reduction), competent, voids to 3/16" over 10% of surface, fossil casts to 1" diameter over 5% surface, dissolution cavities to 1"x2" over 10% surface, 1/2" cavities without infilling, voids to 3/16" over 30-40% of infilling, decreased mottling with depth No Recovery 140.1-141.0' Limestone 141.0-141.75' - Same as 138.1-140.1' 141.75-145.2' - light olive gray with pale orange mottling, (5Y 6/1 with 10YR 8/2), fine grained, strong HCl reaction, medium strong (R3), (possible preferential flow path, oxidation/reduction), competent, voids to 3/16" over 10% of surface, fossil casts to 1" diameter over 5% surface, dissolution cavities to 1"x2" over 10% surface, 1/2" cavities without infilling, voids to 3/16" over 30-40% of infilling, decreased mottling with depth No Recovery 145.2-146.0' Limestone 146.0-149.25' - dark yellowish orange, (10YR 6/6), fine to medium grained, moderate HCl reaction, medium strong (R3), competent, voids to 1/8" over 5-20% of rock, fossil casts to 1" diameter over 0-10% surface, infilling or interbedded material 1"-4" thick at 147.5', 148.3', 148.8', and 149.15', infilling consists of light olive gray (5Y 5/6), fine grained limestone, strong HCl reaction, trace voids to 1/16", trace cavities to 3/4" diameter, dark laminations at 149.25' 149.25-150.1' - Same as 138.1-140.1' except weak to medium strong (R2 to R3), trace organics No Recovery 150.1-151.0' Limestone 151.0-155.5' - Same as 146.0-149.25' except trace dark, wavy laminations at 154.5' 156.0-158.5' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, medium strong (R3), trace voids and fossil casts to 1/4" diameter	R22:11 minutes	
	R22-NQ 5 ft 84%	8	>10	141.35' - Bedding plane or mechanical break, horizontal, smooth, undulating, machine/rock grinding, so not tight				
			10	141.75' - Fracture, 80 deg, rough, undulating, tight and no grind mark				
			>10	141.75-143.3' - Fracture zone, associated with cavities, some staining (dark), fragments average 1" diameter up to 2"x5"				
145 -101.9			10	143.3' - Fracture, 70 deg, smooth, undulating, open, missing opposite face				
			NR	143.7' - Fracture or mechanical break, rough, undulating, dark, 1/4" open				
			>10	144.0' - Fracture, 80 deg, rough, undulating, open				
			2	144.0-145.2' - Fracture zone, as				
	R23-NQ 5 ft 82%	42	3	141.75-142.3' 146.0-146.7' - Fracture zone, fragments to 2" diameter				
			3	146.7' - 20 deg, rough, undulating, dark, open, missing opposite face				
150 -106.9			0	146.85' - Fracture, 70 deg, rough, undulating, dark, tight				
			NR	146.95' - Fracture, 30 deg, smooth, planar				
			1	147.05, 148.45' - Fractures (2), 40 deg, smooth, undulating				
			10	147.8, 148.15, 148.25' - Bedding plane (3), <5 deg, rough, undulating, tight to 1/4", low angle fracture				
	R24-NQ 5 ft 100%	62	>10	149.35' - Bedding plane or mechanical break, <5 deg, rough, undulating, open, missing opposite face			Note: after fractures were measured, it was noticed that the beginning of this run is the end of R23, therefore subtract 0.9' from all depths.	
			2	149.35-149.55' - Fracture zone, fragments up to 2"x1"				
			2	149.55' - Fracture, 40 deg, smooth, planar				
			4	149.68' - Fracture, <5 deg, rough, undulating, open, missing opposite face				
155 -111.9			2	151.2' - Fracture, 65 deg, smooth, undulating to stepped, possible stain, tight				
			3	152.25' - Fracture, 20 deg, smooth, undulating to stepped, open by fracture zone				
			4	152.45' - Fracture, 40 deg, smooth, undulating				
			3	152.45-153.05, 153.45-154.0' - Fracture zone (2), fragments 2" diameter				
			2	152.75' - Fracture, 20 deg, smooth, undulating to stepped, open				
			1	153.3' - Fracture, 65 deg, smooth, planar, possible stain, tight				
	R25-NQ 5 ft 98%	68	3	153.45' - Fracture, 85 deg, smooth, planar, open				
			1	154.0' - Fracture, 75 deg, smooth, planar				
			3	154.05' - Mechanical break				
160				154.6, 155.6, 155.8, 156.05' - Bedding plane (4), horizontal, smooth, undulating, tight 1/4" open				



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
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-116.9			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 138.1-140.0' in layers 2"-4" thick, dark, wavy laminations (1/8") at 158.85' No Recovery 160.9-161.0' Limestone 161.0-163.5' - Same as 138.1-140.1' except moderate yellowish brown to dark yellowish brown (10YR 4/2 to 10YR 5/4) mottling from 161.7-163.5' 163.5-164.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, medium strong (R3), voids to 1/8" over 10-20% of rock, fossil cavities to 1/2"-1/4" over 5-10% of rock, possible high percentage of dissolution cavities as evidence by fracture zone breakage pattern No Recovery 164.5-166.6' Limestone 166.6-168.7' - Same as 163.5-164.5' 168.7-171.0' - Same as 163.5-164.5' except pale yellowish brown to dark yellowish orange, (10YR 6/6 to 10YR 6/2), fine grained, voids to 1/16" over 5-20% of surface, few cavities to 1/8"-3/4", medium strong (R3), moderate HCl reaction 171.0-171.5' - Same as 168.7-171.0' 171.5-172.2' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, very strong (R5), voids to 3/16" over 5% of surface, weak HCl reaction, 1" thick, fine grained section at 171.7' 172.2-173.6' - dark yellowish orange, (10YR 6/6), fine to medium grained, mild HCl reaction, weak (R2), with light olive gray, moderate to coarse grained (80% orange, 20% gray, bimodal), 1/16" voids over 40%, trace larger voids/cavities (<3/16") 173.6-176.0' - pale yellowish brown to dark yellowish orange, (10YR 6/2 to 10YR 6/6), very fine grained, 5-10% voids (1/16"), 5% cavities from round 1/4" to 1/4"x1/2" elongate, fossiliferous, strong (R4) dropping to weak to medium (R2 to R3) below 174.8', HCl reaction similar to 163.5-164.5' 176.0-181.0' - Same as 173.6-176.0' except weak to medium strong (R2 to R3)	R25:9 minutes	
	161.0		NR		156.5' - Fracture, 50 deg, smooth, undulating, tight			
			1		156.65' - Fracture, 65 deg, smooth, planar, tight			
			10		156.7, 159.05, 159.15, 159.5, 160.35, 160.5' - Bedding plane (6), horizontal, smooth, undulating, tight, some planar			
	R26-NQ 5 ft 70%	23	>10		157.15' - Fracture, 50 deg, smooth, undulating, tight			
			>10		157.7' - Fractures (2), 70 deg and 5 deg, smooth, undulating, open, missing opposite face			
165			NR		158.95' - Fracture, 65 deg, smooth, undulating, tight		R26:8 minutes	
-121.9			NR		160.35-160.5' - Fracture zone, fragments up to 1"x2'			
			>10		161.85' - Fracture, 45 deg, smooth, undulating, tight			
			>10		162.15' - Fracture or mechanical break, smooth, undulating, tight to 1/4" open			
	R27-NQ 5 ft 88%	42	>10		162.5' - Bedding plane, <10 deg, smooth, undulating, tight	Moderate chatter at 168.0-168.5'		
			2		162.0-164.5' - Fracture zone, fractures associated with dissolution cavities			
			2		166.6-168.7' - Fracture zone, fragments to 3"x2", average 1/4" diameter, associated with possible dissolutions cavities			
170			2		168.7, 169.8, 169.85, 170.2, 170.35' - Bedding plane (5), horizontal and 10 deg, smooth, planar, dark, tight except next to fracture zone	R27:7 minutes		
-126.9			5		171.55, 173.55' - Fractures (2), 60 deg, rough, undulating, tight			
			10		171.65, 171.75, 171.85, 172.3' - Bedding plane (4), horizontal, smooth, undulating, tight			
	R28-NQ 5 ft 100%	55	10		173.55' - Bedding plane, 10 deg, smooth, undulating, tight			
			10		173.65' - Fracture, 45 deg, rough, undulating, tight			
175			10		174.9-174.95' - Bedding plane, 10 deg, smooth, undulating, associated with lamination surfaces, tight	R28:7 minutes		
-131.9			10		174.95-175.55' - Fracture zone, fragments to 3"x1"			
			10		175.55' - Fracture, 30 deg, smooth, planar, tight			
			10		175.7' - Fracture, 70 deg, smooth, planar, tight			
	R29-NQ 5 ft 100%	45	10		175.85' - Fracture, 20 deg, smooth, planar, tight			
			2		176.0-176.25' - Fracture zone, fragments to 1"x2"			
180								



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07A	SHEET 10 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-136.9			10	176.25' - Fractures (2), 70 deg and 40 deg, smooth, planar, open, intersecting fractures, fracture zone		R29:10 minutes	
181.0			>10	176.55' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open	Limestone 181.0-185.2' - pale yellowish brown to dark yellowish orange, (10YR 6/2 to 10YR 6/6), fine to very fine grained, strong HCl reaction, medium strong to very strong (R3 to R5)		
			>10	176.9, 177.0' - Fractures (2), horizontal, smooth, undulating, fragments to 1"x1/4"			
	R30-NQ 5 ft 84%	8	>10	177.8' - Fracture, 75 deg, smooth, undulating, open by fracture zone			
			>10	177.8-178.2' - Fracture zone, fragments to 2" diameter			
			>10	178.2' - Fracture, 75 deg, smooth, undulating, dark, open			
185			1	178.35' - Fracture, 55 deg, smooth, planar, dark, tight			
-141.9			NR	178.45, 178.7' - Fractures (2), 55 deg, smooth, undulating, tight	No Recovery 185.2-186.0'	R30:9 minutes	
186.0			>10	178.85-179.1' - Fracture zone, fragments to 1" diameter	Limestone 186.0-189.4' - Same as 181.0-185.2' except strong to very strong (R4 to R5)		
			>10	179.9' - Fracture, 20 deg and 55 deg, smooth, planar, tight			
			>10	180.0' - Fracture, 30 deg, smooth, planar, dark, tight			
	R31-NQ 5 ft 68%	0	>10	180.75-181.0' - Fracture zone, fragments to 1"x2"			
			>10	181.0-181.45, 182.0-184.35' - Fracture zone (2), fragments to 2"x2", some staining			
190			NR	181.45' - Fracture, 20 deg, smooth, planar, open by fracture zone	No Recovery 189.4-191.0'	Core blockage	
-146.9			NR	181.65' - 10 deg and 75 deg, smooth, undulating to planar, tight		R31:6 minutes	
191.0			10	181.85, 181.9' - Fractures (2), 75 deg, smooth, planar, tight	Limestone 191.0-191.4' - Same as 186.0-189.4' 191.4-195.9' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids to 1/8" over 10-25% of rock, fossil casts to 1/4" diameter over 5-10% of rock, trace dissolution cavities filled with lighter colored porous rock; 193.1-193.2' same as 191.0-191.4' and 181.0-189.4'		
			>10	184.35' - Fracture, 85 deg, smooth, undulating, dark, open by fracture zone			
			3	184.65' - Bedding plane, <5 deg, smooth, undulating, tight			
	R32-NQ 5 ft 98%	65	0	185.0' - Fracture, 85 deg, smooth, undulating, open by fracture zone			
			0	186.0-189.4' - Fracture zone, fragments to 5"x2", dark staining on many faces			
195			1	191.0-191.3' - Fracture zone, fragments to 3" x 1"			
-151.9			NR	191.3' - Fracture, 40 deg, smooth, undulating, dark, some staining, open to fracture zone		R32: Run time not recorded	
196.0			8	192.2' - Fracture, 60 deg, rough, undulating, tight	No Recovery 195.9-196.0'		
			>10	192.5-192.8' - Fracture zone, fragments to 2" in diameter	Limestone 196.0-198.9' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), very fine grained, strong HCl reaction, strong to very strong (R4 to R5), 5-10% voids (1/16"), trace cavities from 1/4" round to 1/4"x1/2"		
			2	192.8' - Bedding plane, 10 deg, rough, undulating, low angle fracture, tight			
			0	193.15' - Bedding plane, <10 deg, smooth, planar, tight			
	R33-NQ 5 ft 97%	60	2	193.25' - Fracture, 50 deg, smooth, planar, tight			
			0	193.75' - Fracture, 30 deg, smooth, planar, tight			
200			0	195.7' - Bedding plane, horizontal, smooth, planar, tight to 1/4" open			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-156.9			>10	196.45, 196.6' - Bedding plane (2), horizontal, smooth, planar to undulating, dark, some staining, tight to 1/8" open	Limestone 198.9-200.85' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate HCl reaction, strong (R4), 2" infilling of elongate cavities 1/8"-1/2" wide and up to 1" long with dark gray infilling, 10% voids (1/16"), trace cavities predominantly round up to 1/2" No Recovery 200.85-201.0' Limestone 201.0-201.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, medium strong (R3), competent 201.3-206.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, strong HCl reaction, medium strong (R3), competent, voids to 3/16", trace fossil cavities, trace dark laminations to 3/16" thick, yellowish orange, porous inclusions to 1"x1/2" over 5-10% of rock from 201.3-203.5' 206.0-207.2' - Same as 201.0-201.3' except trace laminations (3/8" thick) with high void % and one cavity 1"x1/8" 207.2-210.9' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 30% of rock, trace fossil casts to 1/2"x1/4", suspected dissolution in fracture zones, secondary infilling with light olive gray, medium strong rock (R3) to 2"x1/2" in brown rock, moderate HCl reaction No Recovery 210.9-211.0' Limestone 211.0-211.4' - Same as 207.2-210.9' 211.4-212.9' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), very fine grained, very strong HCl reaction, strong (R4), no voids, trace 1/4" cavities, HCl reaction similar to 201.0-201.3' 212.9-215.95' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), voids to <1/16" from 10-30%, a few to many cavities up to 1/2" No Recovery 215.95-216.0'	R33: Run time not recorded	
201.0			NR	196.8' - Fracture, 80 deg, smooth, undulating, dark, some staining, tight to 1/16" open			
			1	197.0' - Fracture, 50 deg, smooth, undulating, tight			
			10	197.05' - Fracture, 10 deg, smooth, undulating, tight			
	R34-NQ 5 ft 100%	58	>10	197.2' - Fracture, 75 deg, rough, undulating, open			
			5	197.2-197.7' - Fracture zone, fragments 2-1/2"x1", some dark staining			
205			3	198.3' - Fractures (2), 65 deg and 25 deg, smooth, planar, tight, intersecting			
-161.9			3	200.35' - Bedding plane, horizontal, smooth, planar to undulating, dark, some staining, tight to 1/16" open			R34: Run time not recorded
			>10	200.35-200.85' - Fracture zone, fragments 1"x2"			
			3	201.5' - Fracture, 40 deg, smooth, undulating, tight			
			3	202.5' - Fracture, 70 deg, smooth to rough, undulating, tight			
	R35-NQ 5 ft 98%	48	>10	202.8' - Fractures (2), 60 deg, smooth, undulating, 2 parallel fractures, tight			
			>10	202.9-203.7' - Fracture zone, fragments to 3-1/2"x1"			
210			>10	203.8, 203.9' - Fractures (2), 55 deg, smooth, undulating, tight			
-166.9			3	204.0, 204.5, 204.75, 205.3' - Bedding plane (4), horizontal, smooth, planar to undulating, tight to 1/4" open		R35: Run time not recorded	
			NR	204.15' - Fracture, 20 deg, smooth, undulating, tight to 1/4" open			
			1	205.4' - Fracture, 80 deg, smooth, undulating, tight			
			10	206.0-206.3' - Fracture zone, fragments to 1.5"x1"			
	R36-NQ 5 ft 99%	52	>10	206.3' - Bedding plane, horizontal, smooth, planar to stepped, open to fracture zone			
			2	207.05' - Bedding plane, horizontal, smooth, planar, tight			
			2	207.2' - Fracture, 70 deg, smooth, planar, tight			
215			2	207.85' - Fracture, 40 deg, rough, undulating, tight			
-171.9			2	208.35' - Fracture, vertical and 40 deg, rough, undulating, open, missing opposite face		R36: Run time not recorded	
			NR	208.6-208.95' - Fracture zone, fragments to 1.5"x1"			
			0	209.0' - Bedding plane, horizontal, smooth, planar, tight			
			0	209.5-210.0' - Fracture zone, fragments to 1.5"x1"			
	R37-NQ 5 ft 98%	80	1	210.25' - Fracture, 30 deg, smooth, undulating, tight to 1" open			
			3	210.6' - Fracture, 30 deg, smooth, undulating, tight to 1/2" open			
220							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-07A	SHEET 12 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-176.9	221.0 R38-NQ 5 ft 68%	23	2	211.8, 212.1, 212.25, 212.3, 212.4, 212.65' - Bedding plane (6), 25 deg, smooth, planar, tight except by fracture zone	[Symbolic Log Pattern]	Limestone 216.0-216.5' - Same as 201.0-201.3' and 211.4-212.9', 216.5-218.6' except trace voids to 1/16" and layers 1/4"-1/8" thick with infill materials as 216.5-218.6' 216.5-218.6' - yellowish gray, (5Y 7/2), medium to coarse grained, weak to moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 20-30% of rock, fossil casts to 1/2" diameter over 5% of rock, trace inclusions of dusky yellow (5Y 7/4), low percentage of voids, infill to 4"x2"	R37: Run time not recorded	
NR			212.35' - Fracture, 25 deg, smooth, planar, open, missing opposite face					
5			212.65-213.6' - Bedding plane, 25 deg, smooth, planar, tight except by fracture zone					
>10			213.6' - Fracture, 25 deg, smooth, planar, open, missing opposite face					
10			214.0' - Fracture, 60 deg, smooth, undulating, tight					
10			214.6' - Fracture, 45 deg, rough, undulating, tight					
NR			215.6' - Fractures (2), 60 deg and 40 deg, smooth, undulating, intersecting fractures, tight to 1/8" open					
NR			215.75' - Fracture, 30 deg, smooth, planar, tight to 1/8" open					
NR			218.6' - Fractures or bedding plane (2), 35 deg and horizontal, smooth, planar to stepped, intersecting fractures, open, missing opposite face					
NR			219.0, 219.3, 219.75' - Bedding plane (3), <5 deg, rough, undulating, tight to 1/4" open					
-181.9	226.0 R39-NQ 5 ft 92%	35	4	219.9-220.0' - Fractures (3), 0,90,50 deg, smooth, planar, intersecting fractures, tight to 1" open, missing opposite face	[Symbolic Log Pattern]	220.5-220.9' - yellowish gray, (5Y 7/2), medium to coarse grained, weak to moderate HCl reaction, voids to 1/8" over 20-30% of rock, fossil casts to 1/2" diameter over 5% of rock, trace inclusions of dusky yellow (5Y 7/4), low percentage voids, infill to 4"x2" No Recovery 220.9-221.0' Limestone 221.0-221.6' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong to very strong (R4 to R5), 15-20% <1/16" voids, laminar appearance in both color and void percentage, transitions from above and below gradual 221.6-221.75' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, strong to very strong (R4 to R5), no voids as 201-201.3' and 211.4-212.9', gradual transitions above and below 221.75-223.7' - grayish orange to yellowish orange, (10YR 7/4 to 5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 5-25% of surface, many cavities up to 3/4" some of which infilled with 25% void rock, strong HCl reaction throughout 223.7-224.2' - Same as 221.6-221.75' 224.2-224.4' - Same as 221.75-223.7' No Recovery 224.4-226.0'	R38: Run time not recorded	
>10			220.5-220.55' - Fracture zone, fragments to 1/2" diameter					
>10			221.5, 221.65, 221.9, 223.3, 223.4, 223.55, 223.65, 223.9, 224.1' - Bedding plane (9), horizontal and 5 deg, smooth, planar, tight except by fracture zone					
10			221.6, 223.35' - Fractures (2), 80 deg, smooth, undulating, tight					
NR			221.95' - 50 deg, smooth, undulating, tight					
10			222.55-222.9' - Fracture zone, fragments to 2"x1/2", mostly 1" diameter					
10			223.0' - Bedding plane, 5 deg, rough, undulating, tight to 1/2" open					
>10			223.55' - Bedding plane, horizontal and 5 deg, smooth, planar, tight except by fracture zone					
>10			223.65-223.9' - Fracture zone, fragments to 2"x1/2", mostly 1" diameter					
>10			223.9' - Bedding plane, horizontal and 5 deg, smooth, planar, tight except by fracture zone					
-186.9	231.0 R40-NQ 5 ft 92%	30	10	224.1-224.15' - Fracture zone, fragments 1/2"x1/4"	[Symbolic Log Pattern]	224.1-224.15' - Fracture zone, fragments 1/2"x1/4"	R39: Run time not recorded	
10			226.0-226.2, 227.65-227.8, 230.1-230.15, 230.4-230.45' - Fracture zone (4), fragments to 2"x1"					
10			226.7' - Mechanical break					
10			227.25' - Mechanical break					
10			227.6, 227.65, 227.8, 228.2, 228.45, 228.5, 228.9, 229.15, 230.3' - Bedding plane (9), horizontal, smooth, undulating to planar, tight except by fracture zones					
10			230.3' - Bedding plane, horizontal, smooth, undulating, tight except by fracture zone					
10			226.0-226.2, 227.65-227.8, 230.1-230.15, 230.4-230.45' - Fracture zone (4), fragments to 2"x1"					
10			226.7' - Mechanical break					
10			227.25' - Mechanical break					
10			227.6, 227.65, 227.8, 228.2, 228.45, 228.5, 228.9, 229.15, 230.3' - Bedding plane (9), horizontal, smooth, undulating to planar, tight except by fracture zones					
-191.9	236.0 R41-NQ 5 ft 70%	10	>10	230.3' - Bedding plane, horizontal, smooth, undulating, tight except by fracture zone	[Symbolic Log Pattern]	230.3' - Bedding plane, horizontal, smooth, undulating, tight except by fracture zone	R40: Run time not recorded	
>10			226.0-226.2, 227.65-227.8, 230.1-230.15, 230.4-230.45' - Fracture zone (4), fragments to 2"x1"					
>10			226.7' - Mechanical break					
>10			227.25' - Mechanical break					
>10			227.6, 227.65, 227.8, 228.2, 228.45, 228.5, 228.9, 229.15, 230.3' - Bedding plane (9), horizontal, smooth, undulating to planar, tight except by fracture zones					
>10			230.3' - Bedding plane, horizontal, smooth, undulating, tight except by fracture zone					
>10			226.0-226.2, 227.65-227.8, 230.1-230.15, 230.4-230.45' - Fracture zone (4), fragments to 2"x1"					
>10			226.7' - Mechanical break					
>10			227.25' - Mechanical break					
>10			227.6, 227.65, 227.8, 228.2, 228.45, 228.5, 228.9, 229.15, 230.3' - Bedding plane (9), horizontal, smooth, undulating to planar, tight except by fracture zones					
240								



PROJECT NUMBER: 338884.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
 WATER LEVELS : 5.0 ft bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-196.9			NR	231.1' - Fracture, <10 deg, rough, stepped, open	Limestone 226.0-277.65' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-25% of rock decreasing with depth, fossil casts to 2"x 1" over 5-10% of rock Limestone 227.65-229.15' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, extremely weak to weak (R0 to R2), trace voids to 1/16", trace cavities to 1"x2", dark laminations to 1/8" thick over 10-20% of surface Clay With Silt (CL-ML) 229.15-229.85' - medium plasticity, poorly competent, clay and silt with limestone fragments to 1/4", strong pungent sulfur or petroleum odor (fetid) 229.85-230.6' - Same as 227.65-229.15' No Recovery 230.6-231.0' Limestone 231.0-235.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids up to 1/16" over 15-20%; <3-5% from 232.8-233.8', where limestone appears to become conglomerate (harder fragments within matrix), cavities up to 3/4"-1-3/16"x3/8"-3/4", penetrate into core surface, becomes thickly laminated and less fragmented with depth with voids and cavities 235.2-235.6' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, extremely weak (R0), poorly competent, somewhat friable; crumbles to silt and sand-sized material (5-10%) No Recovery 235.6-236.0' Limestone 236.0-239.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), poorly competent to competent, somewhat friable, voids up to 1/16" over 50-60% of surface, cavities >5, 2"x2", trace fossil molds/casts 239.1-239.5' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, strong (R4), competent, voids covering 3-10% of surface No Recovery 239.5-241.0'	R41: Run time not recorded	
241.0			>10	231.4-231.7' - Fracture zone, <10 to 90 deg, rough, stepped to undulating, open 232.8' - Fracture, <10 to horizontal deg, rough, undulating, open 232.9-233.4' - Fracture, 80 deg, rough, undulating, open 233.4-234.5, 234.8-235.6' - Fracture zone (2), <10 to horizontal deg, rough, stepped to undulating, open 236.0-237.0, 237.0-238.0' - Fracture zone (2), horizontal to 90 deg, rough, stepped to undulating, open 238.0-239.5' - Fracture zone, various orientations, predominantly limestone gravel 241.0-241.9' - Fracture zone, various orientations, predominantly limestone gravel			
	R42-NQ 5 ft 18%	0	NR	246.0-248.4' - Fracture zone, horizontal to 90 deg, rough, stepped to undulating, open, gravel-sized to fine cobble-sized limestone fragments 247.0' - Mechanical break			R42: Run time not recorded
245 -201.9			>10				
	R43-NQ 5 ft 48%	0	>10				
250 -206.9			NR				4/26/07 11:35 total depth at 251.0' R43: Run time not recorded
251.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 4/21/07 START : 4/21/2007 END : 4/26/2007 LOGGER : C. Wallestad, R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					Limestone 241.0-241.9' - yellowish gray, (5Y 7/2), mild HCl 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 246.0-248.4' - yellowish gray, (5Y 7/2), fine grained, weak to moderate HCl 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
 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 : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
43.2	0.0	1.2	SS-1	2-2-2 (4)	Poorly Graded Sand With Organics (SP) 0.0-0.9' - medium light gray, (N6), moist, loose, fine silica sand, organic material, trace nonplastic fines, plant roots Silty Sand (SM) 0.9-1.2' - grayish brown, (5Y 3/2), moist, loose, fine silica sand, 25% nonplastic fines, organic material	Began drilling at 16:30, 4/21/07	
	1.5						
5 38.2	5.0	0.9	SS-2	2-3-3 (6)	Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - grayish yellow, (5Y 8/4), wet, loose, fine silica sand, 5-10% nonplastic fines, some plant roots		
	6.5						
10 33.2	10.0	1.0	SS-3	3-4-4 (8)	Silty Sand (SM) 10.0-11.0' - yellowish gray, (5Y 7/2), wet, loose, fine grained, fine silica sand, 25% low plastic fines		
	11.5						
15 28.2	15.0	1.0	SS-4	3-2-3 (5)	Silty Sand (SM) 15.0-15.95' - Same as 10.0-11.0'		
	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
 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 : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
23.2	20.0	1.3	SS-5	2-2-3 (5)	Silty Sand (SM) 20.0-21.3' - Same as 15.0-15.95'		
	21.5						
25	25.0	1.0	SS-6	2-2-3 (5)	Silty Sand (SM) 25.0-25.5' - Same as 15.0-15.95' and 20.0-21.3' Clayey Sand (SC) 25.5-26.0' - yellowish gray, (5Y 7/2), moist, loose, fine silica sand, 30% medium plastic fines		
18.2	26.5						
30	30.0	1.4	SS-7	0-0-1 (1)	Silty Sand (SM) 30.0-30.35' - dark yellowish orange, (10YR 6/6), wet, very loose, fine grained, silica sand, 30% nonplastic to low plastic fines, 30.35' abrupt contact in materials, 1/2" thick gray fat clay (CH) seam Clayey Sand (SC) 30.35-31.35' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), moist, very loose, fine grained, silica sand, 35% medium to high plastic fines		Driller's Remark: Weight of hammer drove sampler through top 12 inches of sample Stop work for the day, drilled to 30.0' below ground surface, collected 30.0-35.35', stopped at 17:35 Drilling resumes 08:40, 4/22/07 Water level 13' 10" below ground surface at 08:30
13.2	31.5						
35	35.0	1.5	SS-8	2-5-8 (13)	Sandy Fat Clay (CH) 35.0-36.5' - medium gray with yellowish gray mottling, (N5 with 5YR 7/2), moist, medium stiff, high plasticity, 35% fine silica sand increasing with depth, mottling increasing with depth at 35.7'		Slough at top of 35.0-36.5' has silty sand with iron oxide modules up to 1/4" (most about 1/16")
8.2	36.5						
40							



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
 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 : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
3.2	40.0	1.2	SS-9	1-2-1 (3)	Silty Sand (SM) 40.0-41.2' - light olive gray with medium dark gray mottling, (5Y 5/2 with N4), wet, loose, fine silica sand, 25% nonplastic fines		
	41.5						
45	45.0	1.5	SS-10	3-4-3 (7)	Fat Clay With Sand (CH) 45.0-45.5' - light olive gray with medium dark gray mottling, (5Y 5/2 with N4), moist, medium stiff, high plasticity, no dilatancy, 20% fine silica sand		May also be organic rich
-1.8	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	50.0	1.5	SS-11	2-2-2 (4)	Silty Sand (SM) 50.0-50.3' - yellowish gray, (5Y 7/2), wet, loose, fine silica sand, 25% low plastic fines		
-6.8	51.5				Organic Soil With Sand (OH) 50.3-51.5' - Same as 45.5-46.4'		
55	55.0	1.5	SS-12	2-3-2 (5)	Organic Soil With Sand (OH) 55.0-56.5' - Same as 45.5-46.4' except 30% sand		
-11.8	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
 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 : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
-16.8	60.0	0.9	SS-13	25-50/5 (75/11")	Silt (ML) 60.0-60.9' - yellowish gray, (5Y 7/2), moist, hard, low plasticity, rapid dilatancy, moderate HCl reaction, with carbonate, 1/2" sandy organic soil (OH) seam at top of sample		
	60.9						
65	65.0	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 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
-21.8							
70	70.0	1.5	SS-15	31-41-49 (90)	Silt With Sand (ML) 70.0-71.5' - yellowish gray, (5Y 7/2), moist, hard, fine grained, rapid dilatancy, moderate HCl reaction, 15-20% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, carbonate		
-26.8	71.5						
75	75.0	0.2	SS-16	50/2 (50/2")	Silt (ML) 75.0-75.2' - Same as 70.0-71.5' except 20% coarse sand sized Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log		
-31.8	75.2						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-08	SHEET 5 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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-31.8	75.0							
	R1-HQ 5 ft 30%	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 about 77.5'
			>10	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'	R1: Run time not recorded
			2					
			NR					
80 -36.8	80.0						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 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', 88.1-88.3', and 88.9-94.1'	
	R2-HQ 5 ft 84%	15	3	81.0, 81.3' - Joint (2), horizontal, smooth, planar, some organic material			No Recovery 84.2-85.0'	R2: 7 minutes
			4	81.3-81.9' - Fracture, vertical, rough, undulating, black, staining on 75% of surface				
			4	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)				
			0					
			0					
			NR					
85 -41.8	85.0						Limestone 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 87.5-88.0'	
	R3-HQ 5 ft 100%	65	2					R3: 6 minutes
			2					
			0					
			1					
			>10					
90 -46.8	90.0						90.0-92.3' - Same as 81.9-84.2' 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	92.5-93.0' - Fracture zone			Silt (ML) 92.3-92.7' - light olive brown, (5Y 5/2), moderate HCl reaction, carbonate derived, limestone fragments at bottom of zone	R4: 6 minutes
			2	93.0, 93.15' - Mechanical break (2)				
			NR					
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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-51.8	R5-HQ 5 ft 68%	47	>10 2 3 >10 NR	95.0-95.4' - Fracture zone 95.8, 96.1' - Mechanical break (2) 96.6-97.6' - Fracture, vertical 97.6-98.0' - Mechanical break (3) 98.0-98.3' - Fracture zone	Limestone 92.7-93.3' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, very weak (R1), voids (1/16") over 30% of surface No Recovery 93.3-95.0' Limestone 95.0-95.4' - Same as 92.7-93.3' except trace organics 95.4-95.7' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), voids (1/16") over 85% of surface 95.7-96.1' - Same as 92.7-93.3' 96.1-98.4' - Same as 95.4-95.7' except very fine grained, few voids, zone from 96.5-97.4' has interfingering limestone with voids over 75% of surface, trace organics throughout; thin zones (1-1/5") of carbonate-derived lean clay at 98.1-98.3' No Recovery 98.4-100.0' Fat Clay (CH) 100.0-100.4' - yellowish gray, (5Y 7/2), thin (3/8") layered limestone at 100.3', carbonate derived Fat Clay (CH) 100.4-100.6' - black, (N1), strong HCl reaction, carbonate derived Silt (ML) 100.6-101.0' - light olive gray, (5Y 5/2), strong HCl reaction, carbonate derived	Driller's Remark: lost circulation at 98.0' R5: 10 minutes	
100 -56.8	R6-HQ 5 ft 94%	60	>10 1 2 4 0 NR	100.0-100.8' - Fracture zone, also organics and carbonate derived silt 100.9-101.4' - Fracture or mechanical break, 79 deg, rough, undulating 101.4-101.9' - Fracture zone, some fragments have slight dark staining 102.3, 102.8, 103.0, 103.2, 103.5' - Mechanical break (5) 103.5-103.9' - Fracture, 70 deg, tight		R6:5 minutes	
105 -61.8	R7-HQ 5 ft 0%	0	NR	101.0-104.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16") over 75% of surface, large voids (up to 3/8" x 3/4") over <5%, very fossiliferous 104.2-104.7' - Same as 101.0-104.2' except light olive gray, (5Y 7/2), moderate HCl reaction No Recovery 104.7-110.0' Limestone		R7: 2 minutes	
110 -66.8	R8-HQ 5 ft 38%	37	1 3 NR	110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with N5), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (1/16" or less) over 85% of surface, moderately fossiliferous (casts and molds) No Recovery 111.9-115.0'		Driller's Remark: rod drop 3 feet at 110.0' below ground surface R8: 1 minute	
115							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-71.8	R9-HQ 5 ft 20%	10	1	115.5' - Mechanical break	Sand (SW) 115.0-115.3' - yellowish gray and olive gray, (5Y 7/2 and 5Y 3/2), fine to coarse grained, strong HCl reaction Limestone 115.3-116.0' - Same as 110.0-111.9' except yellowish gray, (5Y 7/2) No Recovery 116.0-120.0'	R9: 3 minutes	
120		NR					
-76.8	R10-HQ 5 ft 30%	0	N/A	120.0-121.5' - yellowish gray, (5Y 7/2), soft, strong HCl reaction, weakly competent limestone fragments at bottom of section, carbonate derived	Sandy Silt (ML) 120.0-121.5" - yellowish gray, (5Y 7/2), soft, strong HCl reaction, weakly competent limestone fragments at bottom of section, carbonate derived No Recovery 121.5-125.0'	Driller's Remark: 120.0-125.0' rod dropped entire interval	
125		NR	N/A				
-81.8	R11-HQ 5 ft 70%	52	>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, staining throughout core 126.4-128.5' - light gray, (N7), strong HCl reaction, very weak (R1), voids (1/16") over 70% of surface, cavities (up to 3/4"x1-9/16") over 5% of surface, very fossiliferous (mold and casts) No Recovery 128.5-130.0'	R10: Runtime not recorded	
125		NR	>10	126.4, 126.6, 127.5' - Mechanical break (3)			
130		NR	1				
130		NR	0				
-86.8	R12-HQ 5 ft 92%	8	>10	131.7-132.0' - Fracture zone	Sandy Silt (ML) 130.0-131.3' - grayish orange to light olive gray, (10YR 7/6 to 5Y 5/2), strong HCl reaction, fine sand-sized particles about 25%, carbonate derived, abrupt transition to 131.3-132.2' Limestone 131.3-132.2' - very pale orange to light olive gray, (10YR 8/2 to 5Y 5/2), fine grained, strong HCl reaction, medium strong (R3), laminated bedding (<1/16" thick) below 131.8', transitions gradually to 132.2-134.6'	R11: 4 minutes	
130		NR	>10	132.4-134.6' - Fracture zone, most are probable mechanical breaks			
130		NR	>10				
130		NR	>10				
130		NR	>10				
135	NR	NR				R12: 7 minutes	



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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-91.8	R13-HQ 5 ft 82%	47	>10	135.0-136.0' - Fracture zone, fragments	[Symbolic Log]	Limestone 132.3-134.6' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, extremely weak to very weak (R0 to R1), trace intervals of laminated bedding No Recovery 134.6-135.0' Limestone 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 HCl reaction, weak (R2), voids (1/16") over 60% of surface, oriented along bedding planes (laminated bedding), zone of medium gray (N5) limestone, medium strong (R3) from 137.9-138.1' No Recovery 139.1-140.0' Limestone 140.0-143.0' - Same as 137.9-139.1' laminated bedding only in top foot of core 143.0-143.3' - Same as 140-143.0' except mottled medium gray (n5), with few voids No Recovery 143.3-145.0'	R13: 5 minutes	
140			3	136.3, 136.6, 136.95' - Mechanical break (3)				
-96.8			1	137.4-137.7' - Fracture zone or mechanical break				
140.0			>10	138.2-138.5' - Fractures (5), smooth, planar, fractures along bedding planes, probably mechanical breaks				
145			NR					
-101.8	R14-HQ 5 ft 66%	13	2	140.4' - Mechanical break 140.6-140.9' - Fracture zone, no visible orientation	[Symbolic Log]	No Recovery 139.1-140.0' Limestone 140.0-143.0' - Same as 137.9-139.1' laminated bedding only in top foot of core 143.0-143.3' - Same as 140-143.0' except mottled medium gray (n5), with few voids No Recovery 143.3-145.0'	R14: 5 minutes	
145			>10	142.2-142.3' - Fracture zone or mechanical break, rough, undulating				
150			>10					
-106.8			NR					
155								
150	R15-HQ 5 ft 86%	68	0		[Symbolic Log]	Limestone 145.0-147.8' - medium light gray to yellowish gray, (N6 to 5Y 7/2), fine grained, strong to moderate HCl reaction, strong to very strong (R4 to R5), voids over 25% of surface, one cavity (3/4"x3/4") passes through core at 145.5' 147.8-149.3' - yellowish gray, (5Y 7/2), very fine grained, strong to very strong HCl reaction, very strong (R5), laminated to thinly bedded, voids (1/16") occur in some bedding planes but not others, overall in about 20% of surface No Recovery 149.3-150.0' Limestone 150.0-150.4' - dusky yellow, (5Y 6/4), fine to medium grained, moderately HCl reaction, very weak (R1), voids (1/16") over 90% of surface 150.4-151.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR 6/2), fine grained, strong HCl reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids (1/16") over 5-10% (mostly in browner rock)	R15: 9 minutes	
150			>10	146.1-146.5' - Fracture zone				
-106.8			3	146.6' - Mechanical break 147' - Fracture, horizontal, rough, undulating, black staining on surface 147.3' - Mechanical break 147.6' - Fracture, horizontal, smooth, undulating, black staining on surfaces 148.3' - Mechanical break				
150			2					
155			0					
155			NR					
150	R16-HQ 5 ft 76%	45	1	150.0-150.3' - Fracture zone	[Symbolic Log]	150.0-150.4' - dusky yellow, (5Y 6/4), fine to medium grained, moderately HCl reaction, very weak (R1), voids (1/16") over 90% of surface 150.4-151.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR 6/2), fine grained, strong HCl reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4' 152.2-153.8' - Same as 150.4-151' except with slight increase in voids (1/16") over 5-10% (mostly in browner rock)	R16: Runtime not recorded	
155			4	151.1, 151.2' - Fractures (2), horizontal, rough, undulating, probable mechanical breaks but surfaces don't match				
155			3	151.3, 151.6' - Mechanical break (2) 152.1' - Fracture, horizontal, smooth, undulating, probable mechanical breaks, but surfaces don't match				
155			1	152.2-153.8' - Fracture, horizontal, smooth, undulating, black, probable mechanical breaks, but surfaces don't match				
155			NR					



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-08	SHEET 9 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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-111.8	R17-HQ 5 ft 78%	47	3	155.1' - Fracture or mechanical break 155.1-155.7' - Fracture, vertical, rough, undulating, some staining on surface	[Symbolic Log]	No Recovery 153.8-155.0' Limestone 155.0-156.1' - Same as 152.2-153.8' 156.1-157.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), voids (1/16") over 35% of surface 157.3-158.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids (1/16") of over 85% of surface, large (3/8") voids over 5% No Recovery 158.9-160.0'	R17: 9 minutes
2			155.7' - Fracture, 5 deg, smooth, planar, coating of olive gray (5Y 3/2), carbonate derived silt and fine sand on faces				
2			156.1' - Fracture, horizontal, smooth, undulating, probable mechanical break, but faces don't match up				
1			156.8' - Mechanical break 156.8-157.2' - Fracture, 70 deg, rough, planar, some black staining on surface				
NR			157.2' - Mechanical break 157.5' - Fracture or mechanical break, rough, undulating				
160 -116.8	R18-HQ 5 ft 16%	0	>10	160.0-160.8' - Fracture zone	[Symbolic Log]	Limestone 160.0-160.4' - Same as 157.3-158.9' 160.4-160.7' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), voids (1/16") over 80% of surface No Recovery 160.8-165.0'	R18: 2 minutes
NR							
165 -121.8	R19-HQ 5 ft 78%	47	2	165.4-165.7' - Fracture or mechanical break, 60 deg, rough, undulating	[Symbolic Log]	Limestone 165.0-168.7' - light olive gray, (5YR 5/2), fine grained, strong HCl reaction, weak (R2), trace laminated bedding 166.7-167.5', voids (1/16"-3/16") over 5% of surface 165.0-166.0'	R19: 8 minutes
4			165.9' - Fracture, 30 deg, rough, undulating				
>10			166.1-166.5' - Fracture or mechanical break, 70 deg, rough, undulating				
>10			166.6, 166.8' - Mechanical break (2) 167.3-167.8' - Fracture zone				
NR			168.2' - Fracture, horizontal, smooth, planar, iron oxide 168.3-168.9' - Fracture zone, probable mechanical break, but faces don't match up				
170 -126.8	R20-HQ 5 ft 94%	52	2	170.0-175.0' - Fracture, vertical, rough, undulating, black, staining on 10% of surface	[Symbolic Log]	No Recovery 168.9-170.0' Limestone 170.0-170.3' - Same as 168.7-168.9' 170.3-174.7' - light olive gray, (5YR 5/2), fine grained, strong HCl reaction, weak (R2)	R20: 9 minutes
>10			170.2' - Fracture, horizontal, probable mechanical break but faces don't match up				
4			171.4-171.9' - Mechanical break				
4			171.9-172.9' - Fracture, vertical, rough, undulating				
4			172.2' - Mechanical break 172.2-172.6' - Fractures or mechanical break (2), rough, undulating				
1			172.6' - Mechanical break 173' - Fracture, horizontal, smooth, planar, slight black staining on surfaces				
175	NR					No Recovery 174.7-175.0'	



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
 WATER LEVELS : 13.8 ft bgs on 04/22/07 START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-131.8	R21-HQ 5 ft 100%	55	2	173.4-173.9' - Fractures or mechanical break (2), horizontal and 50 deg, rough, undulating		Limestone 175.0-180.0' - Same as 170.3-174.7' except laminated bedding from 175.9-176.5' and 179.3-180.0'	R21: 9 minutes	
			2	173.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on surface				
			1	175.6' - Fracture, horizontal, smooth, planar, dark staining on surfaces				
			>10	176.4' - Fracture, horizontal, smooth, planar, coating of carbonate derived silt				
			>10	177' - Fracture or mechanical break, horizontal, rough, undulating				
180	R22-HQ 5 ft 100%	57	>10	177.0-177.3' - Fracture or mechanical break, 70 deg, rough, undulating		180.0-181.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, weak (R2), voids over 75% of surface. Below 180.6', limestone appears to interfinger (possible infilling) and then laminated bedding as in 175.0-180.0'	Plugging borehole on 4/24/07 R22: 6 minutes	
-136.8			2	178.3' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt				
			>10	178.5-179.5' - Fracture zone				
			2	179.6, 179.7' - Mechanical break (2)				
			3	180.3' - Fracture, horizontal, rough, undulating, dark staining				
	2	180.9' - Mechanical break						
185	185.0		2	182.0-182.4' - Fracture or mechanical break, vertical, rough, undulating		Bottom of Boring at 185.0 ft bgs on 4/23/2007		
			3	182.5' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt, trace of dark staining				
			2	183.7, 183.9, 184.0' - Fracture or mechanical break (3), 45 deg, rough, undulating				
-141.8				184' - Fracture or mechanical break, 45 deg, rough, undulating				
				184.4' - Fracture, horizontal, smooth, undulating, dark staining on 70% of surface				
				184.4-184.7' - Fracture or mechanical break, vertical, rough, undulating				



PROJECT NUMBER: 338884.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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
43.1			6"-6"-6" (N)			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
15 28.1						Drilling mud is Quick Gel bentonite
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
23.1						
25	25.0					
18.1		1.1	SS-1	2-2-2 (4) Silty Sand (SM) 25.0-26.1' - light brownish gray, (5YR 6/1), wet, very loose, nonplastic, no HCl reaction, very fine to fine grained sand, 25% fines, silica sand		
	26.5					
30	30.0					
13.1		1.1	SS-2	5-5-6 (11) Silty Sand (SM) 30.0-31.1' - Same as 25.0-26.1' except medium dense		
	31.5					
35	35.0					
8.1		1.5	SS-3	2-3-5 (8) Fat Clay With Sand (CH) 35.0-36.5' - brownish gray and olive gray, (5YR 4/1 and 5Y 4/1), mottled, moist, no HCl reaction, medium stiff, high plasticity, 20% very fine to fine silica sand		
	36.5					
40						



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
3.1	40.0	1.5	SS-4	3-5-2 (7)		Finish drilling for the day 6/14/07, at 18:00 Resume drilling 07:45 on 6/15/07; advance HW casing from 15' to 40'
	41.5					
				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 reaction, 25% nonplastic fines Clayey Sand (SC) 45.0-45.5' - pale yellowish brown, (10YR 6/2), wet, very loose, no HCl reaction, mottled and streaked with medium dark gray (N4), very fine to fine grained sand, 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 HCl 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 black (N2), moist, medium stiff, very high plasticity, no dilatancy, appears to be pyrite grains to sand-sized		
45 -1.9	45.0	1.5	SS-5	0-2-4 (6)		
	46.5					
	50.0					
50 -6.9	50.0	1.4	SS-6	6-5-7 (12)		
	51.5					
				Silty Sand With Organic Soil/ Peat Lenses (SM) 55.0-56.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), mottled, wet, very loose, no HCl reaction, very fine to fine 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'		Driller's Remark: 25% circulation loss starting at 55.0'
	55.0	1.5	SS-7	0-1-1 (2)		
	56.5					
	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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-16.9	60.0	1.5	SS-8	4-4-5 (9)	Silty To Clayey Sand (SM-SC) 60.0-61.5' - Same as 55.0-56.5' except no HCl reaction, interbedded peat/organic soil (PT/OH), interbedded in lenses 1/16"-2" thick, mostly irregular, slickenside appearance in organic soil/peat, sample is 60% organic soil/peat and 40% silty to clayey sand		Driller's Remark: Harder at 64.0'
65	61.5						Driller's Remark: Circulation loss continues at 25%
-21.9	65.0	1.3	SS-9	7-4-9 (13)	Silt (ML) 65.0-65.2' - yellowish gray, (5Y 8/1), moist, medium stiff, nonplastic, rapid dilatancy, moderate HCl reaction, carbonate material, organic soil/peat lenses at top and bottom, 1/4" thick, laminated, same as above Poorly Graded Sand With Silt To Silty Sand (SP-SM) 65.2-66.25' - pale yellowish brown, (10YR 6/2), wet, medium dense, no HCl reaction, fine sand, 10-15% nonplastic fines Silt (ML) 66.25-66.3' - Same as 65.0-65.2'		Driller's Remark: Material from 64.0-70.0' drills hard and soft in layers Will switch to rock coring after 70.0' sample
70	66.5						
-26.9	70.0	0.8	SS-10	39-50/4 (89/10")	Silty Sand (SM) 70.0-70.8' - pale yellowish brown, (10YR 6/2), wet, very dense, mild to moderate HCl reaction, fine to coarse sand, 35% nonplastic fines, trace fine gravel-sized limestone, carbonate materials		
75	70.8						
-31.9					Begin Rock Coring at 72.0 ft bgs See the next sheet for the rock core log		
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-08A	SHEET 5 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 on 6/17/07 START : 6/14/2007 END : 6/16/2007 LOGGER : J. Schaeffer, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
72.0	R1-HQ 5 ft 100%	15	N/A		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) 72.7-72.8' - olive black, (5Y 2/1), medium stiff, medium plasticity, mild HCl reaction Limestone 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 HCl reaction, weak (R2), with trace 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), gray cavity infill at 80.4' with strong HCl 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 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 HCl reaction, weak (R2), <3% voids, several fossil cavities up to 1/2", less friable than above	Box break at 74.5', just below or at near-vertical fracture R1:6 minutes Driller's Remark: Drilling soft intermittently at about 78' R2:5 minutes R3:4 minutes R4:5 minutes	
75 -31.9			4	73.2, 73.5, 74.0' - Fractures (3), rough, undulating, horizontal			
			1	73.3' - Fractures (2), 50 deg, rough, undulating, between two horizontal fractures			
			>10	74.4' - Fracture, 75 deg, rough, undulating			
			3	75.0-76.1' - multiple Fractures to fragments, many vertical fractures with 3-4" fragments, banded at top by 40 deg rough, undulating fracture, at bottom by 20 deg rough undulating fracture			
77.0	R2-HQ 5 ft 84%	83	1	76.9-77.0' - Fractures or mechanical break			
			1	77.15' - Fracture, smooth, planar, horizontal			
80 -36.9			0	78.4' - Fracture, 20 deg, rough, undulating, at zone of increased voids and cavities from 78.3-78.5'			
			1	80.6' - Fracture, 20 deg, rough, some crumble, open, gray infill at cavity included in fracture			
82.0	R3-HQ 5 ft 96%	67	NR				
			2	82.1, 82.8, 83.3, 83.9, 84.3, 86.1, 86.6' - Fractures (7), open to tight, mostly horizontal fractures, substantial voids, gray infill at fracture, possible drilling mud, possibly healed			
			2	83.9-84.5' - softer, bounded by fractures, infill of clay to silt			
85 -41.9			1	85.3' - Fracture, 45 deg, rough, undulating, healed or mechanical break			
			1				
87.0	R4-HQ 5 ft 80%	58	NR				
			3	87.1' - Fracture, open, horizontal fracture to small fragments with two 1" fragments			
			1	87.5' - Fracture, 45 deg, roughly stepped, also a discontinuity, overlying and underlying rock are different, though fracture mostly in underlying rock			
90 -46.9			2	87.8' - Fracture, open, horizontal, roughly stepped, several small 1/2" fragments			
			1	88.6' - similar to fracture at 87.8', but in different material with additional voids and cavities			
92.0			NR	89.9, 90.0' - Mechanical break (2), 0-20 deg			
				90.9' - Fracture, 50 deg, rough, undulating, at end of core			



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
 WATER LEVELS : 4.9 ft bgs on 6/17/07 START : 6/14/2007 END : 6/16/2007 LOGGER : J. Schaeffer, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
95 -51.9	R5-HQ 5 ft 54%	13	<10 3 2 NR	92.0-92.4' - Fracture zone, angular 1/4"-1" of over and underlying material 92.5' - Fracture, rough, undulating, horizontal, end of rock fragments 92.6' - Fracture, 70 deg, rough, undulating, joins with horizontal fracture at 92.5' 93.0' - rough, planar, discontinuity, horizontal, open, faces do not match 93.15' - Fracture, 45 deg, planar, healed, <1/16" relief 93.9, 94.0' - Fracture (2), rough, undulating, horizontal, more open at 93.9', healed at 94.0' 94.4, 94.5' - Fracture (2), 0-30 deg, rough, stepped, open, fragments	Limestone 88.25-91.0' - Same as 87.0-87.3' except with 20% voids and increased elongate fossils, transition from overlying paler-colored material, material has several filled voids, thin (up to 1/4" thick) layers of silt-sized material at 89.5' with moderate HCl reaction, organics at 90.8' No Recovery 91.0-92.0' Limestone 92.0-92.4' - Same as 87.3-88.25' except pale yellowish brown and moderate yellowish brown, (10YR 6/2 and 10YR 5/4), up to 2" angular color blocks co-mingled 92.4-92.7' - Same as 87.3-88.25' 92.7-93.0' - Same as 87.0-87.3' 93.0-93.3' - Same as 87.3-88.25' except transitions to material below at 70 degree angle 93.3-94.1' - Same as 87.0-87.3' 94.1-94.6' - Same as 87.3-88.25' except becoming softer with depth, very weak rock (R1) in the last 2' of interval, fractures at 94.5' and 94.6' in very weak rock 94.6-94.7' - unconsolidated pale yellowish brown and black organics No Recovery 94.7-97.0' Limestone 97.0-97.6' - dark yellowish gray grading to pale greenish yellow with depth, (10YR 4/2 to 10YR 8/2), fine grained, strong HCl reaction, angular blocks of color 97.6-99.8' - pale yellowish brown, (10YR 6/2), strong HCl reaction, weak (R2), fossil cavities up to 1/4" and up to 1" elongated 99.8-100.7' - pale greenish yellow, (10Y 8/2), strong HCl reaction, medium strong to very weak (R3 to R1), <5% voids on core surface, friable 100.7-102.0' - Same as 97.6-99.8' except with fragments at the last 0.2' of interval No Recovery 102.0-102.6' Silt (ML) 102.6-103.6' - light olive gray, (5Y 5/2), very soft, fine grained, moderate HCl reaction, carbonate derived 103.6-104.0' - Same as 102.6-103.6' except with a 1" thick fragment of limestone (yellowish gray (5Y 7/2), very weak [R1], 10% coverage of 1/16" voids)	Driller's Remark: May have lost circulation at 91'	
100 -56.9	R6-HQ 5 ft 100%	73	1 1 1 2 2	97.6' - discontinuity between overlying unconsolidated material and underlying rock, some rock fragments above 98.3' - Fracture, 40 deg, rough, undulating, healed 99.8, 100.2' - Fractures (2), 10 deg, rough, undulating, transition from overlying limestone with voids to yellow limestone at 99.8', then to weaker limestone, both have silt-sized infill 100.7' - Fracture, 70 deg, rough, undulating 101.3' - Mechanical break, or fracture, healed 101.7' - Fracture, 40 deg, rough, undulating, fragments 102.6-103.4' - fragments, unconsolidated 103.4-103.8' - Fracture zone		R5:5 minutes Driller's Remark: No circulation while drilling 92-97'	
105 -61.9	R7-HQ 5 ft 88%	60	NR <10 <10 0 0 0	104.3, 107.35' - Fractures (2), horizontal, infill, upper fracture is open, lower is tight and similar in color, calcareous infill, silt-sized 104.5' - horizontal discontinuity 105.2' - 10 deg, healed or mechanical break		R6:5 minutes Core loss interpreted to be at beginning of core run based on drill time	
110 -66.9	R8-HQ 5 ft 100%	90	2 1 0 2 1	108.1' - Fracture, tight, horizontal or mechanical break 110.1' - Fracture, 10 deg, mechanical, healed 110.9, 111.0' - Fractures (2), horizontal, very similar to fractures and zone at 107.3', calcareous infill, open		R7:4 minutes R8:4 minutes	
112.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-08A	SHEET 7 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 on 6/17/07 START : 6/14/2007 END : 6/16/2007 LOGGER : J. Schaeffer, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
115 -71.9	R9-HQ 5 ft 6%	0	NR	112.15' - Fracture, 10 deg, open, unconsolidated sediments beneath	Limestone 104.0-107.0' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl reaction, weak (R2), 20% voids, fossils 1/4"-1" size Limestone 107.0-112.0' - Same as 104.0-107.0' except extremely weak (R0) at fracture zones (intervals 1"-2" in length) at 107.3' and 110.0'; very consistent color, texture and voids Limestone 112.0-112.15' - Same as 107.0-112.0' Silt (ML) 112.15-112.3' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl reaction, carbonate derived No Recovery 112.3-123.5'	Driller's Remark: 3.5' of void at 113.5-117'	
120 -76.9	R10-HQ 5 ft 0%	0	NR			R9:1 minute	
125 -81.9	R11-HQ 5 ft 58%	0	NR	123.5' - interpret no recovery before due to R10, drill rates, and competent material at 126.0'		Elastic Silt (MH) 123.5-126.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), wet, soft to medium stiff, low plasticity, no to slow dilatancy, strong HCl reaction, trace organics (1/16" fragments and one 1" chunk)	Driller's Remark: Rods lowered without drilling to 120' (about 3 feet)
127.0				126.0, 126.15, 126.2' - Fractures (3), smooth, planar, horizontal, numerous other planes every 1/16"	Limestone 126.0-126.4' - light olive gray, (5Y 5/2), fine to very fine grained, strong (R4), horizontal laminations and fractures, no voids No Recovery 126.4-127.0'	R11:3 minutes Last foot had slow and fast sections (likely 6" of void)	
130 -86.9	R12-HQ 5 ft 96%	45	0	126.3' - Fractures, above horizontal fractures and with partial vertical fractures 126.4' - no recovery 127.1' - Fracture, overlying large fragment to horizontal fracture, with debris 127.1-128.6' - Fracture, vertical, open to tight, gray discolorations along fracture faces, other vertical and horizontal fractures starting from main fracture, but most are short and tight 128.6-128.9' - fragment, terminated below by a 60 deg rough and undulating fracture at 129.0'			
132.0				130.1' - Fracture, rough, undulating, horizontal, open	Limestone 127.0-131.8' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), fine grained, strong HCl reaction, weak (R2), 3% coverage of voids (1/16"), several fossils (casts/molds [elongate (1/4"-1/2")]), shallow (1/4") cavities though very intact looking, at 131.4-131.8' increased voids and cavities, infilled elongate cavities with hard gray limestone	R12:4 minutes	



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 on 6/17/07 START : 6/14/2007 END : 6/16/2007 LOGGER : J. Schaeffer, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
135 -91.9	R13-HQ 5 ft 76%	22	NR 3 >10 5 4 NR	<p>131.5' - Fracture, 70 deg, with several 1-2" fragments mostly elongate, all roughly stepped to undulating, possible multiple vertical fractures</p> <p>132.3-132.4' - Fractures, horizontal, smooth, planar, Fragments bounded by smooth, planar fractures, flat 1/4" triangles</p> <p>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</p> <p>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</p> <p>135.1' - Fracture, 70 deg, rough, undulating</p> <p>135.25, 135.2, 135.5' - Fractures (3), 20 deg, rough, undulating, tight, open</p> <p>135.65' - Fracture, sealed fracture plane with light gray silt-sized infill 1/4" thick</p>	<p>No Recovery 131.8-132.0' Limestone</p> <p>132.0-132.1' - Same as 127.0-131.8' except pale greenish yellow, (10Y 8/2)</p> <p>132.1-132.55' - Same as 126.0-126.4 except moderate to strong HCl reaction, strong (R4), horizontal bedding planes with breaks and fragments broken along horizontal planes</p> <p>132.55-133.75' - Same as 132.0-132.1' except strong HCl reaction, weak to very weak (R2 to R1), weakening and becoming friable with depth</p> <p>133.75-135.8' - Same as 132.1-132.55' except weak to medium strong (R2 to R3), banding/layering with gray and greener bands</p> <p>No Recovery 135.8-137.0' Bottom of Boring at 137.0 ft bgs on 6/16/2007</p>	<p>SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.</p> <p>R13:5 minutes Total depth of boring 137.0'</p> <p>Hole open to 97.0' after removing casing</p> <p>Water level at 4.9' below ground surface at 08:50 on 6/17/07</p>	
137.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
41.3	0.0	1.2	SS-1	1-2-3 (5)	Topsoil 0.0-0.2' - grayish black, (N2), moist, soft, organics, 15-20% fine silica sand 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'		Water level at 2.0'
	1.5						
5	5.0						
36.3		1.1	SS-2	1-2-2 (4)	Silty Sand (SM) 5.0-6.1' - light olive brown to moderate olive brown, (5Y 5/6 to 5Y 4/1), wet, very loose, very fine silica sand, 15-20% nonplastic fines, trace organics		Driller's Remark: Light chattering at 8.0'
	6.5						
10	10.0						
31.3		0.8	SS-3	10-22-50/3 (72/9")	Silt (ML) 10.0-10.75' - grayish yellow to moderate yellow, (5Y 8/4 to 5Y 7/6), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, carbonate material, 3/8" thick lens of clayey sand (SC) at top of sample, bluish gray, fine silica sand, medium plastic fines		Driller's Remark: Very slow rate of penetration (27 minutes)
	11.3						
15	15.0						
26.3		0.8	SS-4	42-50/3 (92/9")	Silt (ML) 15.0-15.8' - Same as 10.0-10.75' except grayish yellow, (5Y 8/4), mild HCl reaction		
	15.8						
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
 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 bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#	TYPE				
21.3	20.0	1.0	SS-5	32-50 (82")	Silt (ML) 20.0-21.0' - Same as 15.0-15.8' except 5-10% very fine to fine sand		
	21.0						
25	25.0	1.2	SS-6	45-47-50/4 (97/10")	Silt (ML) 25.0-26.2' - Same as 20.0-21.0' except very fine to medium sand-sized material increasing to 15% with depth		
16.3	26.3						
30	30.0	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 sand-sized limestone fragments, dark gray (N3) fragments (non-calcareous), with black calcareous material on some surfaces		Driller's Remark: Hard drilling at 29.0'
11.3	30.3						
35	35.0	1.4	SS-8	42-27-40 (67)	Sandy Silt (ML) 35.0-36.4' - light olive gray, (5Y 5/2), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 30-35% fine to coarse sand-sized limestone fragments, trace fine gravel-sized limestone fragments, carbonate material		
6.3	36.5						
40							



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
 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 bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
1.3	40.0	1.5	SS-9	1-2-4 (6)	Silty Sand (SM) 40.0-41.5' - light olive gray to olive gray, (5Y 5/2 to 5Y 3/2), wet, loose, mild HCl reaction, fine to coarse sand-sized limestone fragments, 30% low plastic fines, 5% fine gravel-sized limestone fragments, carbonate materials		Driller's Remark: Lost circulation at 40.0'
	41.5						
45	44.7	0.3	SS-10	50/4 (50/4")	Limestone Fragments And Silt 45.0-45.3' - yellowish gray, (5Y 7/2), mild HCl reaction, carbonate material, 80% fine to coarse gravel-sized limestone fragments; 20% Silt (ML): wet, nonplastic, rapid dilatancy Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log		Split spoon sample SS-10 actually advanced 45.0-45.35'
-3.7							
50							
-8.7							
55							
-13.7							
60							



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 on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-3.7	45.0				No Recovery 45.0-49.0'	Began rock coring at 45.0'	
	R1-HQ 5 ft 20%	0	NR				
50	50.0		>10		Limestone 49.0-49.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, extremely weak (R0), friable, voids over 50-60% of surface	R1:4 minutes	
-8.7			0		49.5-50.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 8/2), very fine grained, mild to moderate HCl reaction, very weak (R1), presence of micro fractures inclined 60-70 deg, voids over less than 1% of surface, 3/4"-1-3/16" size cavities over less than 9% of the surface	Driller's Remark: Last 1.0' is harder than above; no circulation	
	R2-HQ 5 ft 43%	35	2		50.0-51.75' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids over 1-3% of surface, 3/4"-3/16" cavities over up to 10% of the surface, trace fossil cast and molds, trace cavity infilling	Driller's Remark: Very soft from 52.0-55.0'	
			NR		51.05' - Fracture, 60 deg, rough, stepped, tight		
			2		51.75' - Fracture, horizontal, rough, undulating, open	R2:7 minutes	
55	55.0		>1		No Recovery 51.75-54.6'		
-13.7					Limestone 54.6-55.0' - Same as 50.0-51.75' except yellowish gray, (5Y 7/2), voids over less than 3% of the surface, few cavities		
	R3-HQ 5 ft 26%	14	NR		55.0-56.3' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 6/1), fine grained, mild HCl reaction, very weak (R1), voids over 15-30% of surface, cavities are 3/4"-1-3/16" long and 1/8"-3/16" wide, fossiliferous (molds/casts)	R3:7 minutes	
					56.8' - Fracture, 60 deg, rough, stepped to undulating, open		
60	60.0		>10		No Recovery 56.3-60.0'		
-18.7					Limestone 60.0-60.4' - light olive brown, (5Y 5/6), fine grained, mild HCl reaction, extremely weak (R0), voids over 25% of the surface, fossiliferous (possible shark tooth), molds and casts	Driller's Remark: Very soft from 61.0-64.0'	
	R4-HQ 5 ft 30%	20	NR		60.4-64.0' - light olive brown, (5Y 5/6), fine grained, mild HCl reaction, extremely weak (R0), voids over 25% of the surface, fossiliferous (possible shark tooth), molds and casts		
					64.0' - Fracture, 0-50 deg, rough, stepped	R4:7 minutes	
65	65.0		1				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-09	SHEET 5 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 on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-23.7	R5-HQ 5 ft 100%	16	N/A	69.2' - Fracture, 40 deg, smooth, stepped to undulating, black coating over 5% of the joint surface	Limestone 64.0-65.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, extremely weak (R0), voids up to 1/16" over 40-50% of surface, 3/4"-1-3/16" size cavities over 1-3% of surface, fossiliferous (molds/casts) Carbonate Sand (SP) 65.0-69.2' - moderately yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), wet, loose, fine to very fine grained, moderate HCl reaction	Driller's Remark: Hard spot at 67.0'	
70			N/A				
-28.7			N/A				
70.0			>1				
-28.7	R6-HQ 5 ft 36%	22	0	71.1' - Fracture, 0-60 deg, rough, stepped, open 71.35' - Fracture, horizontal, rough, stepped, open 71.4' - Fracture, horizontal, smooth, stepped, open	Limestone 69.2-70.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, very weak (R1), voids up to 1/16" over 15-20% of the surface, 1/16-1/8" size voids becoming more abundant with depth, slightly fossiliferous (molds and casts) 70.0-71.55' - Same as 69.2-70.0' except mottled No Recovery 71.55-74.75'	R5:4 minutes Driller's Remark: No return of circulation continues ever since 45.0' R6:9 minutes	
75			>3				
-33.7			NR				
75	R7-HQ 5 ft 44%	36	>1	74.75' - Fracture, 50 deg, rough, undulating, open	Limestone 74.75-75.0' - moderate yellow, (5Y 7/6), fine to very fine grained, moderate HCl reaction, extremely weak (R0), friable, slightly fossiliferous (molds/casts), mottled with very fine grained lamination with fewer voids, few cavities up to 3/16"x3/16" No Recovery 75.0-77.8'	Driller's Remark: Recovery from bottom (77.8-80.0')	
80			NR				
-38.7			1				
80.0			2				
80.0			3				
85	R8-HQ 5 ft 68%	38	1	78.8' - Fracture, 30 deg, smooth, undulating, black stain over 5% of surface 79.0' - Fracture, <5 deg, smooth, undulating, tight 79.35' - Fracture, <5-30 deg, rough, stepped to undulating, open 80.4' - Fracture, <5 deg and 50 deg, rough, undulating, open 80.8' - Fracture, <5 deg, smooth, undulating, open 81.0' - Fracture, 0-70 deg, rough, stepped, open 81.1' - Fracture, 40 deg, rough, undulating, open 82.05' - Fracture, <5-50 deg, rough, stepped to undulating, open 82.3' - Fracture, 40 deg, rough, stepped, open	Limestone 77.8-79.0' - yellowish gray, (5Y 7/2), mottled, very fine grained, mild HCl reaction, weak (R2), voids up to 1/16" over 15-25% of surface, few cavities up to 3/16", slightly fossiliferous (casts and molds), up to 1" cavities with secondary infill of limestone with voids (1/16") over 40% of surface 79.0-80.0' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak (R2), voids up to 1/16" over 3% of surface, interspaced with cavities with 2% infill of very weak lamination with voids over 50-60%, trace fossil (mold/cast)	R7:8 minutes	
85.0			4				
			NR				
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-09	SHEET 6 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 on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-43.7	R9-HQ 5 ft 0%	0	NR		Limestone 80.0-83.4' - yellowish gray, (5Y 7/2), fine to very fine grained, mild to moderate HCl reaction, very weak (R1 to R2), voids (up to 1/16") over 15-25% of surface, many 3/16"x1/16" cavities, few cavities up to 3/8"x3/16", fossiliferous (molds/casts) No Recovery 83.4-90.0'	On 4/5/07 at 85.0', advanced HW casing to 86.0' from 45.0' due to sand interval above a slipping casing, very soft at 86.0', able to hammer casing easily several feet, able to get the circulation back Lost circulation at 87.0'	
90 -48.7	R10-HQ 5 ft 20%	0	NR		Limestone Fragments 90.0-90.5' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, very weak (R1), voids over 50-60% of surface with cavities up to 3/16", fossiliferous (infill/casts) No Recovery 90.5-93.0'	R9:5 minutes Driller's Remark: Pulled core barrel but no recovery, tagged the bottom of borehole at 90.0', suspect 85.0-90.0' is sand 90.0-90.5' firm drilling 90.5-93.0' very soft 93.0-94.0' some what harder 94.0-95.0 very soft	
95 -53.7	R11-HQ 5 ft 52%	0	NR		Limestone 93.0-93.5' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, weak (R2), voids over up to 5-10% of surface, carbonate black coating on 5% of the surface, cavities No Recovery 93.5-95.0'	R10: No run time recorded	
100 -58.7	R12-HQ 5 ft 58%	36	NR		Limestone 95.0-95.8' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, weak (R2), voids over 13% of surface, with sand and silt-sized carbonate grains, clayey No Recovery 95.8-98.2'	Driller's Remark: HW casing continue to drop, advancing HW to 95.0'	
			1		Limestone 98.2-100.0' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, weak (R2), up to 1/16" voids over 15-20% of surface, few cavities up to 9/16"x3/4" on the surface, mottled, interspaced with very fine grained limestone with fewer voids, fossiliferous (molds and casts)	R11:8 minutes	
			1		98.5' - Fracture, 60 deg, rough, stepped, tight, inclined 99.0' - Fracture, horizontal, rough, undulating, tight		
			>10		100.0-100.3' - Fracture zone, <5 deg and 60 deg, rough, undulating, open 100.75-101.0' - Fracture zone, <5 deg, rough, undulating, open		
			4		101.3-101.55' - Fracture zone, <5-60 deg, rough, stepped, open		
			>10		101.9' - Fracture, horizontal, smooth, planar, clay infilling 102.05' - Fracture, <5 deg, rough, undulating, open 102.5-102.9' - Fracture zone, 0-90 deg, rough, stepped, open		
105			NR		100.0-101.4' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, weak (R2), gravel-sized fragments, voids up to 1/8" over 25-30% of surface, few 3/8"x3/16" cavities on surface, fossiliferous (molds/casts)	R12:11 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-63.7	R13-HQ 5 ft 48%	23	10	105.0-106.0' - Fracture zone, 0 to inclined 60-70 deg, rough, undulating, open	Limestone 101.4-101.9' - pale greenish yellow to yellowish gray, (10Y 8/2 to 5Y 7/2), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3) Clay With Limestone (CL) 101.9-102.2' - black to very dark gray, (N1 to N3), wet, soft, black carbonate coated gravel-sized fragments Limestone 102.2-102.9' - Same as 100.0-101.4' except yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), cavity infilling up to 1-3/16"-3/4", fossil molds and casts No Recovery 102.9-105.0' Limestone 105.0-107.4' - yellowish gray, (5Y 7/2), fine to very fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), fossil molds and casts, voids up to 1/16" over 30-40% of surface, few cavities up to 3/16"x3/16" exist on the rock surface No Recovery 107.4-110.0' Limestone 110.0-112.45' - Same as 105.0-107.4' No Recovery 112.45-115.0' Limestone 115.0-116.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), friable, voids up to 1/16" over 25-30% of surface, 3/4"-1-3/16" cavities rarely exist on surface, rare fossiliferous (casts/molds) No Recovery 116.0-125.0'	R13:7 minutes	
110			10	106.45' - Fracture, <5 deg, rough, undulating, open			
-68.7			110.0	>10			106.45-107.4' - Fracture zone, rough, stepped, various orientations, open
115	R14-HQ 5 ft 49%	23	4	110.2' - Fracture, 70 deg, rough, stepped, open	110.6' - Fracture, 70 deg, rough, stepped 110.8' - Fracture, <5 deg, rough, stepped, joins with fracture at 110.6' 111.3- 111.9' - Fracture zone, various orientations 112.45' - Fracture zone, 0-90 deg, rough, stepped, open	R14:4 minutes	
115			>10	110.5' - Fracture, 0-90 deg, rough, stepped, open			
-73.7			115.0	1			110.6' - Fracture, 70 deg, rough, stepped
120	R15-HQ 5 ft 20%	7	3	115.2' - Fracture, 0-60 deg, rough, undulating to stepped, open	115.0-116.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), friable, voids up to 1/16" over 25-30% of surface, 3/4"-1-3/16" cavities rarely exist on surface, rare fossiliferous (casts/molds) No Recovery 116.0-125.0'	R15:4 minutes	
120			NR	115.4' - Fracture, 40 deg, rough, undulating, tight			
-78.7			120.0	NR			115.85' - Fracture, 50 deg, rough, undulating, open
125	R16-HQ 5 ft 0%	0	NR		Driller's Remark: Retrieved a handful of material consisting of loose sand, carbonate material, moderate to high HCl reaction, silty to sandy, light gray	R16:3 minutes	



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 on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-83.7	R17-HQ 5 ft 34%	0	>10	125.0-126.0' - Fracture (>10), <5 deg and horizontal, rough, undulating to stepped, inclined (40-50 deg), open 126.0-127.0' - Fracture (>10)	Carbonate Sand With Silt (SP-SM) 125.0-125.5' - pale olive to yellowish gray, (10Y 6/2 to 5Y 7/2), wet, loose, fine grained, rapid dilatancy, moderate HCl reaction, trace limestone fragments Limestone 125.5-126.5' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, extremely weak (R0), voids over 10-15% of surface 126.5-126.7' - light olive gray, (5Y 5/2), mild HCl reaction, very weak (R1), voids up to 1/16" over 5-10% of surface, cavities up to 3/16"x3/16" No Recovery 126.7-130.0' Limestone 130.0-131.0' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), fine to very fine grained, mild HCl reaction, very weak (R1), voids up to 1/16" over 10-15% of surface, fossil molds and cast are rare, some solution cavities up to 1"x3/16" No Recovery 131.0-135.0' Limestone 135.0-136.75' - yellowish gray, (5Y 7/2), very fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), 1/16" voids over 1-3% of surface, many 2"-2-3/8"x3/4"-1-3/16" cavities on rock surface, fossil molds and casts No Recovery 136.75-138.6' Limestone 138.6-139.05' - light olive gray, (5Y 5/2), very fine grained, moderate HCl reaction, weak (R2), voids up to 1/16" over 1-3% of surface 139.05-139.15' - yellowish gray, (5Y 7/2), very fine grained, very weak (R1), voids up to 1/16" over 10% of surface, trace fossil casts and molds 139.15-140.0' - Same as 138.6-139.05' except mottled with brownish limestone	Stop drilling 04/06/2007 Resume on 04/07/07; water level 6.0' below ground surface R17:3 minutes	
130 -88.7	R18-HQ 5 ft 20%	0	>10	130.0-131.0' - Fracture (>10), vertical and horizontal, rough, stepped to undulating, open		R18:7 minutes	
135 -93.7	R19-HQ 5 ft 64%	35	3 >10 NR	135.4' - Fracture, 30 deg, smooth, undulating, open 135.6' - Fracture, 0-90 deg, smooth, stepped, open 2"-3" 135.95' - Fracture, rough, planar to stepped, open	R19:10 minutes		
140 -98.7	R20-HQ 5 ft 78%	29	>1 2 10 NR >10 3 3 2	138.6' - Fracture, horizontal, smooth, planar, open, tan to black stain over 100% of surface (20% black, 1/16" thick) 139.05' - Fracture, <5 deg, rough, stepped to undulating, open 139.15' - Fracture, <5 deg, rough, undulating, open 140.2' - Fracture, horizontal, smooth, planar, open 140.5' - Fracture, horizontal, smooth, undulating, open 141.5-141.9' - Fracture zone, 0-90 deg, rough, undulating to stepped, various orientations 141.9-142.3' - Fracture, vertical, rough, undulating, tight 142.3' - Fracture, <5 deg, rough, stepped, open	R20:11 minutes		
145							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-103.7	R21-HQ 5 ft 94%	60	2	142.9' - Fracture, horizontal, rough, stepped, open	[Symbolic Log]	Limestone 140.0-140.5' - light olive gray, (5Y 5/2), very fine grained, moderate HCl reaction, weak (R2), voids up to 1/16" over 1% of surface (concentrated along break), 1-3/16"x3/8" cavity, some infilling in cavity No Recovery 140.5-141.5' Limestone 141.5-144.1' - light olive gray, (5Y 5/2), very fine grained, mild HCl reaction, very weak to weak (R1 to R2), friable from 141.5-142.5', cavities up to 1/8"-3/16" over 40-50% of surface, 3/8"x3/16" cavities over 1-3% of surface, cavities and voids mostly present in 142.3-143.2', laminated with very fine grained limestone, less than 1% voids from 143.6-143.8' 144.1-144.5' - light olive gray, (5Y 5/2), very fine grained, mild to moderate HCl reaction, weak (R2), voids up to 3/16" over less than 1% surface, two 3/16"x3/16" cavities, trace fossil casts and molds No Recovery 144.5-146.1' Limestone 146.1-147.1' - light olive gray with yellowish gray mottling, (5Y 5/2 with 5Y 7/2), fine grained, mild to moderate HCl reaction, weak (R2), voids over 5-15% of the surface, several 3/16"x3/16" cavities, trace fossil molds and casts 147.0-146.1' - Same as 144.1-144.5' 147.1-147.4' - light olive gray with yellowish gray mottling, (5Y 5/2 with 5Y 7/2), fine grained, mild HCl reaction, very weak (R1), thinly cemented, 1-3/16"-1-9/16"x1/8" cavities, occasional clay bedding parallel to bedding plane, voids up to 1/16" over 1-3% of the surface 147.4-147.6' - dark yellowish brown, (10YR 4/2), fine grained, mild HCl reaction, extremely weak (R0), small voids over 40-50% of surface, friable with depth 147.6-149.7' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, weak (R2), voids over 5-10% of surface, cavities (3/16"x3/8") over 1-2% of the surface, trace fossil molds and casts, cavities No Recovery 149.7-150.0'	R21:7 minutes
			3	143.3' - Fracture, 15 deg, smooth, planar, open			
			4	143.9' - Fracture, <5 deg, rough, undulating, open			
			0	144.1' - Fracture, <5 deg, rough, undulating, open			
			1	144.25' - Fracture, 60 deg, rough, stepped, tight			
			NR	145.5' - Fracture, 20 deg, rough, undulating, tight			
150	R22-HQ 5 ft 100%	72	2	145.65' - Fracture, 60 deg, rough, stepped, tight	[Symbolic Log]		R22:7 minutes
-108.7			2	145.45' - Fracture, 10 deg, rough, planar, open			
			3	146.5' - Fractures, horizontal, rough, undulating, open			
			2	146.85' - Fracture, 10 deg, smooth, undulating, tight			
			2	147.0' - Fracture, vertical, rough, undulating, tight			
			1	147.1' - Fracture, horizontal, rough, planar, open			
155			2	147.4' - Fracture, 15 deg, smooth, planar, open, silt/clay lens (<1/16" thick)	[Symbolic Log]		
-113.7			1	147.55' - Fracture, 10 deg, rough, stepped, <1/16" thick silty clay lenses			
				149.6' - Fracture, 0-50 deg, rough, stepped			
				150.45' - Fracture, <5 deg, rough, undulating, open			
				150.75' - Fracture, horizontal, rough, planar, open			
				151.35' - Fracture, <5 deg, rough, stepped, open			
				151.7' - Fracture, horizontal, smooth, planar, open			
				151.85' - Fracture, horizontal, rough, stepped, open			
				152.6' - Fracture, <5 deg, rough, undulating, open			
				153.0' - Fracture, smooth, planar, 1/16" silty clay liner covers 100% of surface			
				153.3' - Fracture, <5 deg, rough, undulating, open			
				153.55' - Fracture, rough, undulating, open			
				154.15' - Fracture, horizontal, smooth, planar, tight			



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 2.0 ft bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					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 4/7/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-10	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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
42.3	0.0	1.3	SS-1	1-2-2 (4)	Topsoil Grading To Poorly Graded Sand With Organics (SP) 0.0-1.3' - grayish black, (N2), moist, very loose, fine grained, silica sand, 50% organics decreasing with depth, trace nonplastic fines		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08) Water levels not recorded during drilling
	1.5						
5 37.3	5.0	0.9	SS-2	3-3-3 (6)	Silty Sand (SM) 5.0-5.9' - light brown, (5Y 5/6), moist, loose, fine silica sand, 15-20% nonplastic fines, trace organics		Weight of hammer enough to drive of SS-3 first 12"
	6.5						
10 32.3	10.0	0.7	SS-3	0-0-1 (1)	Silty Sand (SM) 10.0-10.7' - pale orange, (10YR 8/2), wet, loose, fine to medium grained, strong HCl reaction, 20% low plastic fines, fossiliferous, carbonate material		Driller's Remark: Feels like hard material
	11.5						
15 27.3	15.0	0.8	SS-4	40-50/3 (90/9")	Silt (ML) 15.0-15.8' - grayish orange, (10YR 7/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 5-10% very fine sand-sized, carbonate materials		
	15.8						
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
22.3	20.0	1.4	SS-5	28-45-43 (88)	Silt (ML) 20.0-21.4' - Same as 15.0-15.9'		
	21.5						
25	25.0	1.5	SS-6	35-44-33 (77)	Silt (ML) 25.0-26.5' - Same as 15.0-15.9'		
17.3	26.5						Driller's Remark: Water loss at 28.0'
30	30.0	1.3	SS-7	17-32-32 (64)	Sandy Silt (ML) 30.0-31.3' - Same as 15.0-15.9' except grayish orange, 20-25% fine to coarse sand-sized, trace fine gravel-sized limestone, carbonate materials		
12.3	31.5						Driller's Remark: Hard drilling at 32.5'
35	35.0	1.2	SS-8	31-26-24 (50)	Silt With Sand (ML) 35.0-36.2' - yellowish gray, (5Y 7/2), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, very fine to fine sand-sized, 10% fine to coarse sand-sized, carbonate		
7.3	36.5						
40							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	6"-6"-6" (N)					
2.3	40.0	1.5	SS-9	10-17-27 (44)	Sandy Silt (ML) 40.0-41.5' - Same as 35.0-36.2' except 30-35% fine to coarse sand-sized and trace organics		
	41.5						
45	45.0	1.1	SS-10	23-52-50 (102)	Silty Sand (SM) 45.0-46.1' - Same as 40.0-41.5'		Driller's Remark: Will set casing to 45.0' below ground surface
-2.7	46.5						Driller's Remark: Hard drilling at 47.0', sample was slough in sand-sized limestone fragments
50	50.0	0.0	SS-11	50/2 (50/2")	No Recovery 50.0-50.2' Begin Rock Coring at 50.0 ft bgs See the next sheet for the rock core log		
-7.7	50.2						
55							
-12.7							
60							



PROJECT NUMBER: 338884.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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-7.7	50.0 R1-NQ 1 ft 40%	0	2	[Symbolic Log Column]	Limestone 50.0-50.4' - light olive gray, (5Y 5/2), fine grained, mild to moderate HCl reaction, medium strong (R3), voids (1/16") over 10-40% of surface, thin elongate fossil molds mostly 1/4" and up to 1/2", moderately fossiliferous No Recovery 50.4-56.0'	R1:3 minutes	
51.0	R2-NQ 5 ft 0%	0	NR			R2:8 minutes	
55							
-12.7							
56.0							
	R3-NQ 5 ft 7%	7	NR	Limestone 56.0-56.3' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 25% of surface, 1/8" thin elongate fossil molds some larger 1/4"-1/2" cavities and fossil molds No Recovery 56.3-61.0'	Core stuck in HW casing		
60							
-17.7						R3: Run time not recorded	
61.0							
	R4-NQ 5 ft 70%	13	1	Limestone 61.0-62.45' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), numerous 1/16"-3/16" voids, thick black horizontal bedding plane laminations, elongate 1/4" long fossil molds and casts throughout, moderately fossiliferous Silty Sand (SM) 62.45-63.8' - moderate yellowish brown, (10YR 5/4), nonplastic, mild to moderate HCl reaction, 60% fine sand, 30% fines, 10% limestone fragments, non-cohesive, massive, easily friable and ground to fine sand, calcareous Limestone 63.8-64.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids (1/16") over 20-25% of surface, trace larger up to 3/16" voids and fossil molds, trace organic black beds No Recovery 64.5-66.0'	R4:7 minutes		
65							
-22.7							
66.0							
	R5-NQ 5 ft 90%	10	0	66.6' - Fracture, horizontal, rough, planar, followed by non to weak sediment/rock 66.6-70.5' - Fractures, 0-20 deg, occasionally more of a fracture zone, silt-sized fragments			
70							



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 : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-27.7			0			Limestone 66.0-66.6' - moderate yellowish brown, (10YR 5/4), fine grained, extremely weak to medium strong (R0 to R3), no voids where extremely weak rock (R0), voids (1/16") over 5% of surface where medium strong (R3), trace organics, strong HCl reaction where extremely weak rock (R0) at the top, moderate HCl reaction where medium strong (R3) at the bottom	R5:6 minutes	
71.0			NR					
	R6-NQ 5 ft 78%	18	0	71.0-72.9' - Fractures, several horizontal breaks				
			1	72.9' - Fracture, horizontal, rough, undulating				
			2	73.5, 73.6' - Fractures (2), horizontal, smooth to rough, planar, open				
			1	74.1' - Fracture, horizontal, smooth, planar, open				
75			NR					
-32.7			NR			No Recovery 70.5-71.0' Limestone 71.0-72.9' - dark yellowish orange to grayish orange, (10YR 6/6 to 10YR 7/4), fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), friable	End of core at 74.9', matches/mates with next core at 76.0' R6:6 minutes	
	R7-NQ 5 ft 96%	60	0	77.05' - Fracture, 10 deg, rough, undulating				
			3	77.2' - Fracture, horizontal, rough, planar, healed				
			>10	77.65, 77.9' - Fractures (2), horizontal, smooth, planar, tight to open				
			2	78.0-78.8' - Fractures, horizontal, multiple breaks				
			2	79.05' - Mechanical break, 10 deg, rough, undulating				
80			1	79.5' - Fracture, horizontal, rough, stepped, open, missing portion of fracture				
-37.7			NR	80.05' - Fracture, 10 deg, rough, planar, tight		No Recovery 74.9-76.0' Limestone 76.0-77.05' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids (1/16"-1/8") over 25% at top reducing to 0% voids with depth (transition sharpest at 76.6')	R7:7 minutes	
	R8-NQ 5 ft 100%	67	2	81.25' - Fracture, 10 deg, rough, planar, healed				
			2	81.75' - Fracture, 10 deg, rough, planar, open with 1/4" infill on each face (coating is same as lithology described for 81.0-81.75')				
			0	82.35' - Fracture, horizontal, rough, planar, open with 1/4" infill on each face (coating is same as lithology described for 81.0-81.75')				
			3	83.75' - Fracture, horizontal, rough, undulating, tight				
			>10	84.2-84.4' - Fractures, horizontal, rough, undulating, filled with material as described for 81.0-81.75'				
85			>10	84.75' - Fracture, 10 deg, rough, planar, tight to open with fine coating of infill similar to 82.35'				
-42.7			5	85.2' - Fracture, horizontal, rough, stepped, very open, with fragments				
			8	85.3' - Fracture, horizontal, smooth, planar				
			>10	85.3-86.0' - Fractures, several horizontal and vertical, angular (1/2"-3") fragments				
			>10	86.1' - Fracture, 10 deg, smooth, stepped, tight to open, subangular to subrounded fragments				
			>10	86.25, 86.35, 86.4, 86.5' - Fractures (4), horizontal, rough, planar to undulating, tight				
90	R9-NQ 5 ft 78%	13	>10			No Recovery 80.8-81.0' Limestone 81.0-81.75' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained, strong HCl reaction, very weak (R1)	R8:15 minutes	



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-10	SHEET 6 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-47.7	91.0		NR		Limestone 81.75-84.2' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (<1/16") over 5-15% of surface, except for 1" interval at 83.4' with 25% voids on surface	R9:9 minutes	
			5		84.2-84.4' - Same as 81.0-81.75' except extremely weak (R0)		
			3		84.4-85.3' - Same as 81.75-84.2' except weak (R2), voids over 3% of surface, this material more of a transition between the two types from 81.0-84.2'		
	R10-NQ 5 ft 88%	38	5		85.3-86.0' - Same as 81.0-81.75' except strong HCl reaction, very weak (R1)	R10:8 minutes	
95			1		86.0-86.5' - moderately yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, weak (R2), fine organic inclusions, no voids		
-52.7			0		86.5-87.1' - Same as 86.0-86.5' except fine (<1/16") voids over 30% of surface (up to 40% at 86.6'), few larger 1/4" cavities/fossil molds		
			NR		87.1-88.9' - Same as 86.0-86.5' except very weak to weak (R1 to R2), voids vary over 10-30% of surface		
			0		88.9-89.9' - Same as 86.0-86.5' except weak to medium strong (R2 to R3), 10% voids (<1/16"), few larger (1/4") cavities/fossil molds	R11:7 minutes	
			0		No Recovery 89.9-91.0'		
			1		Limestone 91.0-91.4' - dark yellowish orange, (10YR 6/6), fine grained, moderate to 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'	
100			4		91.4-95.4' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, weak to medium strong (R2 to R3), no voids		
-57.7			0		91.5-91.8' - voids (1/16") over 10-20% of surface elsewhere, some fossil cavities/molds variably up to 1/2", though most smaller, poorly fossiliferous	R12:7 minutes	
			NR		No Recovery 95.4-96.0'		
			6		Limestone 96.0-98.75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 3-10% of surface, few cavities/molds up to 1/2", but most are 1/4"		
			5				
			1				
	R12-NQ 5 ft 74%	47	5				
			5				
105			NR				
-62.7			2				
			0				
			>10				
	R13-NQ 5 ft 76%	48	2				
			2				
110							



PROJECT NUMBER: 338884.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

WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-67.7			NR	106.35, 106.55' - Fractures (2), 10 deg, rough, undulating, open, fine calcareous infill/coating		98.75-99.95' - Same as 96.0-98.75' except weak (R2), voids from 15-40% of surface, increased voids and cavities at 98.75-99.2', with fractures	R13:5 minutes	
111.0			0	108.25, 108.6' - Fractures (2), 20 deg, rough, stepped, very open, with dissolved appearance		Limestone		
	R14-NQ 5 ft 100%	80	2	108.6-109.1' - Fracture zone, subangular, primarily 1/2"-3/4" with a few larger fragments		99.95-100.7' - Same as 96.0-98.75' except weak to medium strong (R2 to R3), voids decrease with depth from 5% to 0% of surface where black laminations (<1/16" thick each) become darker brown/gray banded organics		
			4	112.45' - Fracture, 45 deg, rough, stepped, nearly healed		No Recovery 100.7-101.0' Limestone		
115			2	112.8' - Fracture, horizontal, rough, stepped, open		101.0-101.8' - dark yellowish brown, (10YR 4/2), fine grained, moderate to strong HCl reaction, strong (R4), voids over 3% of surface, few 1/4" elongated fossil casts, banded black organics (lignite) in upper portion turning to minor with depth	R14:6 minutes	
-72.7			8	113.5' - Fracture, 30 deg, rough, stepped, open		101.8-104.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), voids (1/16") over 25% of surface, thin elongated 1/4"-1/2" fossil molds, few larger cavities up to 3/4", small casts (1/4"), fossiliferous		
	R15-NQ 5 ft 72%	13	2	113.7, 114.0' - Fractures (2), horizontal, rough, planar, open to tight		No Recovery 104.7-106.0' Limestone		
			4	113.85' - Fracture, vertical, rough, undulating, tight, bounded by overlying and underlying horizontal fractures		106.0-109.8' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), some short, weaker fracture zones, voids (1/16") over 25% of surface, many round to oval 1/4" fossil molds, increased size and frequency of cavities (up to 1/2") at 108.25-109.1'	R15:7 minutes	
			>10	114.2' - Fracture, 10 deg, smooth, undulating, very open		No Recovery 109.8-111.0' Limestone		
			3	114.95-115.1' - Fractures, rough, stepped, subangular rock fragments bounded by horizontal fractures		111.0-116.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 25-40% of surface, 1/4"-1" areas of lighter-colored infill with strong HCl reaction; infill is clayey in texture often not at fractures		
120			NR	115.3, 115.5' - Fractures (2), 20-30 deg, rough, undulating, tight to open		116.0-118.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") voids over 5% of surface, fine bedding planes particularly from 116.65-117.1', except at 117.6-118.0' where rock is friable and extremely weak (R0)	R16:5 minutes	
-77.7			NR	116.85, 116.95, 117.05, 117.1' - Fractures (4), 0-10 deg, rough to smooth, planar to undulating, along bedding planes				
	R16-NQ 5 ft 70%	32	4	117.35' - Fracture, horizontal, rough, stepped, open				
			>10	117.6' - Fracture, horizontal, rough, stepped			Driller's Remark: 100% water loss at 120.0'	
			4	118.3' - Fracture, horizontal, rough, stepped, terminates the fragments			Quite possible no recovery is from fracture zone of 118.0' (which would shift down to 119.6')	
			0	118.45-119.1' - Fracture zone, rock fragments, gray subangular rock fragments from 1/2"-1"				
			2	119.75' - Fracture, vertical, rough, undulating, from overlying rock fragments to end core at 119.6' some fragmentation/splitting				
125			NR	121.0-121.9' - Fractures (12), horizontal, every 1/2"-1", all tight to open with rounding				
-82.7			NR	122.05, 122.2, 122.25, 122.3' - Fractures (4), horizontal, smooth, undulating, open to tight				
	R17-NQ 5 ft 78%	53	7	124.05' - Fracture or mechanical break, 20 deg, rough, undulating, healed				
			8	124.3' - Fracture, horizontal, rough, undulating, tight				
			>10	126.6' - Fracture, horizontal, smooth, stepped, open to fragments/fracture zone below				
			0	126.6-127.5' - Fracture zone, subangular and angular fragments 1/2"-2", browner at top, grayer at bottom				
			7	127.5' - Fracture, horizontal, rough, stepped, fracture terminates fracture zone, gray fragments above, brown limestone beneath, abrupt transition at fracture				
130			0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-10	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R QD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-87.7	131.0		NR	128.2-128.5' - Fracture, horizontal, rough, stepped, leads into several inches of angular (1/4"-1/2") fragments		118.0-119.6' - light olive gray, (5Y 3/2), fine grained, moderate to strong HCl reaction, medium strong (R3), voids (1/16") over 5-10% of surface No Recovery 119.6-121.0' Limestone	R17:6 minutes	
			1	128.75' - Fracture, horizontal, rough, planar, tight		121.0-124.5' - yellowish gray, (5Y 8/1), very fine grained, strong HCl reaction, weak (R2), voids (1/16") over 5% of surface, trace fossil imprints (mostly on fracture faces), after 122.05' inclusion of gray very fine to fine grained particles		
	R18-NQ 5 ft 86%	57	4	131.8' - Fracture, horizontal, rough, planar, tight		122.05' - transition to fine to medium grained and yellowish gray (5Y 7/2) after 122.5', less friable		
			7	132.7' - Fracture, horizontal, smooth, planar, open		No Recovery 124.5-126.0' Limestone		
			1	132.7-133.5' - Fractures, smooth, planar, rock fragments (fragments broken in horizontal plane, then broken again)		126.0-127.5' - moderate yellowish brown to dark yellowish orange, (10YR 5/4 to 10YR 6/6), moderate HCl reaction, medium strong (R3), some subtle change in color with olive gray (5Y 3/2) fragments,		
135			5	134.8' - Fracture, horizontal, smooth, planar, open		127.0-127.5' voids over 5% of surface, few 1/4" cavities		
-92.7	136.0		NR	135.1' - Fracture, horizontal, smooth, planar, smooth to planar lower face, open		127.5-129.9' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong (R3), voids (1/16"-3/8") over 15% of surface, many 1/8"-1/4" cavities	R18:8 minutes	
			>10	135.2, 135.25, 135.3' - Fractures (3), horizontal, smooth, planar		No Recovery 129.9-131.0' Limestone		
			0	135.1-135.3' - Fracture zone, horizontal, planar		131.0-132.7' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong (R3), voids (1/16"), many 1/4" cavities (elongate and round up to 3/4")		
	R19-NQ 5 ft 22%	7	NR	136.0-136.6' - Fractures, horizontal, smooth, planar, angular fragments		132.7-135.3' - moderate yellowish brown to dusky yellow, (10YR 5/4 to 5Y 6/4), moderate to strong HCl reaction, medium strong (R3), voids over 3% of surface with occasional zones of 15% coverage, no to few cavities except at zones with more voids, HCl reaction is strongest in zones with few voids	R19:4 minutes	
				136.6' - Fracture, horizontal, smooth, planar, terminates fragments	No Recovery 135.3-136.0' Limestone			
				136.8' - Fracture, horizontal, rough, planar, open to tight	136.0-137.1' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids over 0-5% of surface with occasional band of increased voids (and small cavities), generally no cavities, harder where no voids, weaker where voids are present			
140			>10	141.0-141.9' - Fracture zone, with angular rock fragments	No Recovery 137.1-141.0'			
-97.7	141.0		>10	141.2' - Fracture, 10 deg, rough, stepped, open to fragmented				
			>10	141.4' - Fracture, 10 deg, rough to smooth, stepped to undulating, open to fragmented				
	R20-NQ 5 ft 60%	25	3	141.7, 141.9' - Fracture (2), 20 deg, rough, stepped, open with cavities/fragmentations				
			NR	142.15' - Fracture, 20 deg, rough, stepped, very open				
145				142.6' - Fracture, 10 deg, rough, stepped, open to fragmented				
-102.7	146.0			142.8, 143.05' - Fractures (2), 10 deg, rough, stepped, open		R20:10 minutes		
			4	142.6-142.8' - 1/2"-3/4" angular fragments				
			2	143.1' - Fracture, vertical, rough, stepped, 1" long				
	R21-NQ 5 ft 72%	48	1	143.15' - Fracture, horizontal, rough, stepped, discontinuity, smooth on upper side, rough to planar on low side				
			>10	143.8' - Fracture, horizontal, rough, planar to undulating, open				
				146.6, 146.7, 146.8, 146.9' - Fractures (4), horizontal, rough, planar, open, concurrent with increasing voids (described in lithology)				
150				147.35' - Fracture, 0-60 deg, rough, undulating, tight, with infill				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-10	SHEET 9 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-107.7	151.0		NR	147.65' - Fracture, horizontal, smooth, rounded on upper gray surface, sharp, smooth to planar, 0 deg on bottom		Limestone 141.0-144.0' - light olive gray transitioning to pale yellowish brown to grayish orange, (5Y 5/2 to 10YR 6/2 to 10YR 7/4), fine to very fine grained, moderate HCl reaction, strong (R4), 141.0-143.15' voids over 5% of surface, several 1/4" long and some larger cavities, 143.15-144.0' no voids, no cavities, more brown in color with turbid-looking laminations, black organic inclusions and laminations (milky/blurred laminations) No Recovery 144.0-146.0' Limestone 146.0-147.65' - light olive gray, (5Y 5/2), fine to very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 0-3% of surface but 1" bands of 10% with 1/4" elongate fossil molds Limestone 147.65-149.6' - dark yellowish orange, (10YR 6/6), moderate HCl reaction, medium strong (R3), voids (1/16") over 30% of surface at top to voids (1/16"-3/8") increasing gradually by end of core to 50% of surface, very few larger cavities, though few elongated very thin up to 1/2" long, some organic inclusions and secondary recrystallization No Recovery 149.6-151.0' Limestone 151.0-152.6' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine to very fine grained, moderate HCl reaction, strong (R4), voids (1/16") over 3% of surface, inclusion of fine (1/16") black organics, few 1/4" infilled cavities 152.6-155.2' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 5-10% of surface, but some variability along core, few 1/4" cavities, trace organic inclusions, few laminar features at 153.0-153.9' No Recovery 155.2-156.0' Limestone 156.0-157.65' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, medium strong (R3), voids over 5% of surface to 156.9' increasing to 10-30% to 157.65', few 1/4" cavities increasing at 156.8-157.2'	R21:6 minutes	
	R22-NQ 5 ft 84%	58	0	148.75' - Fracture, 30 deg, smooth, planar, tight to healed			R22:8 minutes	
			0	149.25' - Fracture, horizontal, rough, planar, tight to open				
			7	149.95-149.6' - Fracture zone, subangular fragments				
			1	153.0' - Fracture, horizontal, rough, planar, zone of increased voids with some bedding planes and laminar features				
155 -112.7			0	153.25, 153.3' - Fractures (2), horizontal, rough, undulating, open with some very minor fragmentation				
			NR	153.5' - Bedding plane, horizontal, rough to smooth, planar, open 1/8"				
	R23-NQ 5 ft 76%	53	1	153.7, 153.8, 153.9' - Bedding plane (3), horizontal, rough, planar, open, bedding planes ridged and 1/8"-1/4" thick, no bedding planes after last fracture				
			2	154.8' - Fracture, horizontal, rough, undulating, open				
			4	156.85' - Fracture, horizontal, rough, planar, open				
			3	157.25' - Fracture, horizontal, smooth, planar, tight				
160 -117.7			NR	157.8' - Fracture, 70 deg, rough, planar, completely healed, closed, but broken open by load testing, surface is nearly 100% dark gray		R23:8 minutes		
				158.65, 158.75, 158.85' - Fractures (3), horizontal, smooth, planar, tight to open, weathered				
				159.1' - Fracture, horizontal, rough to smooth, stepped to planar, open				
				159.4, 159.5' - Fractures, 10 deg, rough, undulating, tight, weathered		Total depth of boring is 161.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-10	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
					Limestone 157.65-158.5' - dusky yellow to grayish orange, (5Y 6/4 to 10YR 7/4), very fine grained, moderate HCl reaction, strong (R4), no voids or cavities except one 1/2" discrete band with 10% voids 158.5-159.8' - Same as 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 4/22/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-11	SHEET 1 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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.9						Begin drilling at 15:00 24" split spoon
3.5						
5	0.8	SS-1	1-2-1 (3)	Silty Sand (SM) 3.5-4.25' - grayish orange, (10YR 7/4), wet, very loose, 20% nonplastic fines, fine gravel fragment, non-calcareous, very fine grained to cemented silt, silica sand		
37.9	5.0					
8.5						
10	1.1	SS-2	1-1-3 (4)	Poorly Graded Sand With Organics (SP) 8.5-9.6' - dusky yellowish brown, (10YR 2/2), wet, very loose, 15-20% fine organics, fine silica sand		
32.9	10.0					
13.5						
15	1.1	SS-3	5-6-8 (14)	Silty Sand (SM) 13.5-14.6' - pale yellowish brown, (10YR 6/2), wet, medium dense, 20-25% nonplastic fines, trace very fine sand-sized black particles, fine silica sand		SS-3 taken at 15:12
27.9	15.0					
18.5						
20	1.5	SS-4	7-10-9 (19)			SS-4 taken at 15:11
20.0	20.0					



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.9				Silty Sand (SM) 18.5-20.0' - medium dark gray mottled with pale yellowish brown, (N4 with 10YR 6/2), wet, medium dense, trace fine sand-sized black particles, 15-20% nonplastic fines, fine silica sand		
23.5	1.5	SS-5	5-5-5 (10)	Silty Sand (SM) 23.5-25.0' - pale yellowish brown, (10YR 6/2), wet, loose, 20-25% nonplastic fines, trace very fine sand-sized black particles, fine silica sand		SS-5 taken at 15:25
25 17.9						
28.5	1.5	SS-6	6-5-3 (8)	Silty Sand (SM) 28.5-30.0' - Same as 23.5-25.0' except trace black laminae		SS-6 taken at 15:43
30 12.9						
33.5	1.5	SS-7	3-2-2 (4)	Silty Sand (SM) 33.5-35.0' - pale yellowish brown, (10YR 6/2), wet, very loose, 20% nonplastic fines, fine silica sand, trace fine black particles		SS-7 taken at 15:49
35 7.9						
38.5	1.5	SS-8	4-5-3 (8)	Silty Sand (SM) 38.5-40.0' - Same as 33.5-35.0' except loose		SS-8 taken at 15:54
40						



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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.9						
43.5						
45	1.0	SS-9	6-6-8 (14)	Clayey Sand (SC) 43.5-44.5' - light bluish gray to light gray mottled with yellowish gray, (5B 7/1 to N7 with 5Y 8/1), wet, medium dense, 35-40% high plastic fines, trace fine black particles, very fine to fine silica sand		SS-9 taken at 16:01
45						
48.5						
50	1.3	SS-10	2-2-3 (5)	Silty Sand (SM) 48.5-49.0' - pale yellowish brown, (10YR 6/2), wet, very loose, 30% low plastic fines, very fine to fine silica sand		SS-10 taken at 16:09
50						
53.5						
55	1.3	SS-11	8-13-11 (24)	Clayey Sand (SC) 49.0-49.75' - dark gray, (N3), wet, loose, 30-35% medium plastic fines, very fine to fine silica sand		S-11 taken at 16:19
55						
58.5						
60	1.5	SS-12	3-2-3 (5)	Silty Gravel With Sand (GM) 53.5-54.8' - medium dark gray, (N4), wet, medium dense, no HCl reaction, fine to coarse angular gravel, appears to be calcite cemented, fine silica sands, 10-15% nonplastic fines, 20% very fine to fine silica sand		Driller's Remark: 16:15 - 52.5' light rig chatter of drag bit SS-12 taken at 16:35 Driller's Remark: 16:27 switch to 3-7/8" tricone roller bit to continue drilling
60						



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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-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		
63.5							
	1.3	SS-13	2-2-2 (4)		Interbedded Silty Sand And Organic Soil (SM-OH) 63.5-64.8' - Same as 58.5-60' except 80% silty sand and 20% organics		
65 -22.1	65.0						End drilling for 2/07/07 at 17:12 at 65.0' below ground surface
	68.5						Start drilling on 2/8/07 at 08:30
	1.5	SS-14	8-18-35 (53)		Organic Soil (OH) 68.5-69.0' - brownish black, (5YR 2/1), wet, stiff, medium plasticity, slow dilatancy, laminated in sharp contact with silt below		Driller's Remark: slightly firmer, but no chatter
70 -27.1	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		
	73.5						
	1.5	SS-15	28-26-42 (68)		Silt (ML) 73.5-75.0' - Same as 69.0-70.0' except yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 5-10% thinly bedded (3/16"-1-3/16"), black (N1) organic layers, trace fine black (N1) organic particles in silt, carbonate		SS-15 taken at 08:55
75 -32.1	75.0						
	78.5						
	0.8	SS-16	24-50/3 (74/9")				SS-16 taken at 09:13
	79.3						
80							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-11	SHEET 5 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
 DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" drag bit ORIENTATION : Vertical
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-37.1					Silty Sand With Limestone (SM) 78.5-79.3' - yellowish gray, (5Y 7/2), wet, very dense, mild HCl reaction, fine to coarse sand-sized, 25% low plastic fines, 25% fine to coarse gravel-sized limestone fragments, 5% organics, carbonate		
83.5 83.7	0.0		SS-17	50/2 (50/2")	Limestone Fragments 83.5-83.7' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, two 1/4" thick limestone fragments recovered		SS-17 taken at 09:33 Driller's Remark: Advised driller to begin coring, will use HQ coring assembly 09:44 begin setting casing using 'devils head' bit for 4" casing Resume drilling at 16:40
85 -42.1	0.0		R1-HQ		No Recovery 85.0-90.0'		R1: No run time recorded
90 -47.1	0.2		SS-18	50/2 (50/2")	Limestone Fragments 90.0-90.2' - yellowish gray to moderate yellow, (5Y 7/2 to 5Y 7/6), mild HCl reaction Begin Rock Coring at 90.0 ft bgs See the next sheet for the rock core log		SS-18 taken at 16:45
95 -52.1							
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-11	SHEET 6 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 on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-47.1	90.0		>10		Limestone And Limestone Fragments 90.0-91.0' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium grained, weak to medium strong (R2 to R3), 40-50% voids (<1/16") over surface up to 1/16", unfilled dissolution cavities up to 3/8", highly competent, up to 15% black (N1) organic laminations and coarse-sized particles, limestone gravel is the same as the larger (2-1/2") fragments, strong HCl reaction on pulverized fragments No Recovery 91.0-95.0'	Start drilling R2-HQ with core barrel at 18:00 Driller will flush hole, then attempt to core again, the next core run will be R2-HQ The order of samples is as follows: SS-17, R1-HQ, SS-18, R2-HQ Driller's Remark: Very little, if any circulation loss R2:3 minutes 18:15, last run of 2/8/07	
	R2-HQ 5 ft 20%	0	NR				
95 -52.1	95.0		>10		Limestone 95.0-95.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, weak to medium strong (R2 to R3), strong HCl reaction where pulverized, voids up to 1/16" over 50-70% of surface, strongly competent, fossiliferous (casts, molds up to 10%), trace medium grained black organics with moderate HCl reaction No Recovery 95.7-99.0'	Start coring with NQ assembly at 15:50 on 2/9/07 Driller's Remark: Hard drilling over 95.0-96.0' interval Recovery for R3-NQ is only limestone core fragments from 1-1/2"-2-1/2", last core run of 2/9/07, end drilling for 2/9/07 at 16:45 R3:15 minutes Start coring R4-NQ at 09:05 on 2/10/07	
	R3-NQ 4 ft 18%	0	NR				
100 -57.1	99.0		>10		Limestone 99.0-100.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), 20-30% voids up to 1/16" over surface, trace dissolution cavities up to 3/16" on surface, fragments up to 3-1/2", mostly fine to coarse gravel-sized fragments, trace organic (black) fragments as medium grained and 1/16"-sized laminations No Recovery 100.0-104.0'	Initial recovery from R4-NQ sample barrel is one 1" core fragment, recovery from NQ drill bit and casing is two larger fragments of core and gravel-sized pieces of limestone Driller's Remark: Switch of drill bit to NQ wireline bit Driller's Remark: It was discovered that a conventional NQ drill bit had been in use for the previous runs R4:10 minutes	
	R4-NQ 5 ft 20%	0	NR				
105 -62.1	104.0		1		104.0-105.5' - yellowish gray to light olive gray, mottled slightly darker, (5Y 7/2 to 5Y 5/2), medium grained, strong HCl reaction, weak to medium strong (R2 to R3), highly competent rock, voids up to 1/8" over 25-35% of surface, few increasing with depth, many dissolution cavities up to 3/8"x3/4", oval-shaped, filled cavities with a very pale orange (10YR 8/2) filling, fossiliferous (moderately) molds and casts, trace organics as medium grained black particles No Recovery 105.5-108.3'	Driller's Remark: Soft zone at 107.0' for 1.0-1.5' R5:11 minutes	
			1	104.5' - Fracture or bedding plane, horizontal, rough, undulating, tight			
			28	104.85', 105.0' - Mechanical break (2) 105.5' - Fracture, 30 deg, rough, undulating, dissolution cavities on the surface			
	R5-NQ 5 ft 40%		NR				
	109.0		3		108.3' - Fracture, 20 deg, rough, undulating, open, assumed not a mechanical break 108.45' - Fracture, horizontal, rough, undulating 108.5' - Fracture, 20 deg, rough, undulating		
			1				
110							



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-11	SHEET 7 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 on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-67.1	R6-NQ 5 ft 82%	56	>10	109.15' - Fracture, horizontal, smooth, undulating, open 1/2"	Limestone 109.0-113.1' - Same as 104.0-109.0' except many dissolution cavities 1/8"x3/8", 15% voids <1/16" over surface, light olive color (5Y 5/2) transitions to dusky yellow gray (5Y 6/4) mottled with light olive gray (5Y 5/2) No Recovery 113.1-114.0' Limestone 114.0-119.0' - mottled pale yellowish orange and light olive gray, (10YR 8/6 and 5Y 5/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), strongly cemented, 40-50% voids up to 1/16" over rock surface, poorly fossiliferous (casts), <1% fine to medium grained black particles 119.0-121.4' - mottled pale yellowish orange and medium gray and light olive gray, (10YR 8/6 and N5 and 5Y 5/2), fine to medium grained, weak to medium strong (R2 to R3), strong HCl reaction on light colored areas, moderate HCl reaction on darker colored areas, strongly competent, 20-30% voids 1/16"x1/16", 5-10% dissolution cavities 1/8"x1/16", poorly to moderately fossiliferous, casts, 1" section at top is moderate olive brown (5Y 4/4) and moderately to highly fossiliferous (casts) No Recovery 121.4-124.0' Limestone 124.0-124.6' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, very weak (R1), weakly to moderately competent, voids (<1/16") over 75% of surface, 40% fine to medium grained black (N1) particles 124.6-126.4' - light olive brown and moderate olive brown, (5Y 5/6 and 5Y 4/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), moderately to highly fossiliferous (many casts, trace molds), white crystal as partial infill in cavities (with mild to moderate HCl reaction) No Recovery 126.4-129.0'	Driller's Remark: Loose drilling at 111.0'	
			>10	110.0-110.3' - Fracture zone, vertical and horizontal, tight			
			1	110.55' - Fracture, <5 deg, rough, undulating, tight			
			NR	111.0-111.4' - Fracture zone, rock fragments			R6:4 minutes
			3	111.9' - Fracture, 20 deg, black stain, tight			
			NR	112.85' - Fracture, 10 deg, smooth, undulating, no infill, black staining			
114.0			3	112.85' - Fracture, 10 deg, smooth, undulating, no infill, black staining			
115			>10	114.5' - Mechanical break, horizontal, smooth, undulating, tight			
-72.1	R7-NQ 5 ft 100%	30	3	114.6' - Fracture, <5 deg, smooth, undulating, black staining, open 1/2"			
			4	114.8' - Fracture, 40 deg, rough, undulating, no staining, open, top of fractured zone at 114.8-115.7"			
			1	116.0' - Mechanical break, horizontal, rough, undulating, tight		R7:6 minutes	
			NR	116.2' - Fracture, vertical, rough, undulating, black staining, open			
			1	116.55' - Fracture, <5 deg, rough, undulating, stains over 1/4"			
119.0			1	116.8' - Mechanical break, horizontal, smooth, planar, open 1/8"			
120			>10	117.0, 117.25, 117.45' - Mechanical break (3)			
-77.1	R8-NQ 5 ft 48%	20	NR	117.85' - Fracture, 70 deg, rough, undulating		Driller's Remark: 121.0-122.5' soft	
			NR	118.1' - Fracture, horizontal, smooth, undulating, open		Driller's Remark: Slightly harder drilling at 122.5'	
			NR	118.2' - Fracture, <5 deg, rough, undulating, open 3/8"		R8:6 minutes	
			NR	118.6-118.7' - Fracture zone or mechanical break		Driller's Remark: 123.5' slipped down	
			NR	119.1' - Mechanical break, along bedding plane from drilling		Started R9-NQ at 14:27	
			NR	119.5, 119.6' - Fracture (2), horizontal, rough, undulating, open			
			NR	119.9' - Fracture, horizontal, rough, planar, open			
124.0			>10	120.05-121.0' - Fracture zone, rough, undulating, open			
			1	124.0-124.6' - Fracture zone			
			3	124.6' - Mechanical break, horizontal		Driller's Remark: Soft at 124.0-127.0'	
			NR	125.1' - Fracture, <5 deg, rough, undulating, open			
			NR	126.15' - Bedding plane, rough, stepped, open 1/4"			
			NR	126.25' - Fracture, horizontal, rough, undulating, open 1/4"			
			NR	126.4' - Fracture, horizontal, rough, undulating, open		R9:3 minutes	
			>10	129.0-130.8' - Fracture zone			
129.0			>10				
130			>10				



PROJECT NUMBER: 338884.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
 WATER LEVELS : 1.7 ft bgs on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-87.1	R10-NQ 5 ft 74%	26	>10	130.8' - Fracture, horizontal, rough, undulating, tight		Limestone 129.0-132.7' - Same as 124.6-126.4'	Consistent medium drilling	
			0	131.0' - Fracture, 60 deg, rough, undulating, tight				
			0	131.65' - Fracture, 40 deg, rough, undulating, tight				
			NR	132.3' - Fracture, <5 deg, rough, undulating, open, fractured from 132.3-132.7'			No Recovery 132.72-134.0'	R10:4 minutes
134.0								
135			1	134.1' - Fracture, <5 deg, rough, undulating, open 1-1/2"			Limestone 134.0-137.3' - Same as 124.6-126.4' except 25% oblong-shaped dissolution cavities (up to 1/4"x1/8"), stronger rock at 135.0-135.5' and 136.3-137.3'	
-92.1	R11-NQ 5 ft 66%	30	>10	135.0' - Fracture, horizontal, rough, undulating, open				
			>10	135.0-135.4' - Mechanical break				
			0	136.15' - Fracture, <5 deg, rough, undulating, top of fractured zone 136.15-136.8', mechanical breaks to 1-1/2" fragments			No Recovery 137.3-139.0'	Driller's Remark: Soft at 137.0-138.0'
			NR	136.8' - Mechanical break, horizontal 136.9' - Mechanical break 137.05' - Fracture, vertical, slickensided, stepped				R11:4 minutes
139.0				137.3' - Fracture, <5 deg, rough, undulating, open				
140			>10	139.25' - Bedding plane, horizontal, rough, planar, open 1/8", top of fractured zone of more friable material, 139.25-139.9' mechanical breaks		Limestone 139.0-139.9' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, mild to moderate HCl reaction, medium strong (R3), trace bedding, voids <1/16" over 10-15% surface on stronger intervals, up to 45% on more friable intervals, 10-15% black possible organics	Driller's Remark: Very soft from 141.5-143.5'	
-97.1	R12-NQ 5 ft 30%	0	1	139.25, 139.9' - Mechanical break (2)				
			NR	140.1' - Fracture, 50 deg, smooth, undulating 140.3' - Fracture, <5 deg, rough, undulating			R12:3 minutes	
144.0								
145			3	144.4' - Fracture, 10 deg, rough, undulating, open		No Recovery 140.5-144.0'	Start R13-NQ at 16:09, ended at 16:14	
-102.1	R13-NQ 5 ft 86%	40	>10	144.6, 144.9' - Fracture (2), <5 deg, rough, undulating, open		Limestone 144.0-146.2' - Same as 139.9-140.5' except less mottling, highly bioturbated, trace very fine to fine organic particles in bioturbated zones	Driller's Remark: 146.5-147.5' were alternating soft to medium drilling	
			4	145.2, 145.4' - Fracture (2), horizontal, rough, undulating, open 1/4"				
			2	145.6' - Fracture, <5 deg, grayish brown (5YR 3/2) stain, tight, 1/8"				
			2	145.75-146.2' - Fracture zone, limestone gravel up to 1"x1/2"				
			NR	146.2' - Mechanical break, tight 146.4' - Bedding plane, horizontal, smooth, undulating, organic infill, tight		No Recovery 148.3-149.0'	Driller's Remark: Hard at 147.5' R13:5 minutes	
			NR	146.65, 146.8' - Mechanical break (2)				
			>10	147.1, 147.35' - Fracture (2), horizontal, smooth, planar, open 1/2"				
149.0								
150						Limestone 149.0-149.5' - Same as 146.2-148.3'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-107.1	R14-NQ 5 ft 86%	37	3	148.3' - Fracture, horizontal, rough, undulating, open		Limestone 149.5-151.9' - light olive brown to light olive gray, (5Y 5/6 to 5Y 5/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), poorly fossiliferous (casts), trace voids up to 1/8" 151.9-153.3' - Same as 146.2-148.3' No Recovery 153.3-154.0'	Measured depth of water at 1.7' below ground surface on 2/11/07 at 08:30	
5			149.0-149.35' - Fracture zone, limestone gravel-sized fragments to 3/4"x1"					
0			149.35' - Fracture, horizontal, rough, undulating, open					
1			149.5' - Fracture, horizontal, rough, undulating, open 3/16"					
NR			149.75' - Fracture, horizontal, rough, undulating, tight					
154.0	R15-NQ 5 ft 76%	18	1	149.9' - Fracture, horizontal, rough, undulating, open, top of fracture zone		Limestone 154.0-157.2' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), ripple laminated in light olive gray (5Y 5/2), alternating parallel intervals of bioturbation, voids up to 1/16" over 5-10% of surface 157.2-157.8' - olive gray, (5Y 3/2), medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 50-70% of surface, trace dusky yellow (5Y 6/4) discoloration No Recovery 157.8-159.0'	R14:7 minutes	
1			150.2' - Fracture, horizontal, rough, undulating, tight to open 1/8"					
1			150.3, 150.35, 150.72, 151.0, 151.25, 151.6, 151.75, 151.9' - Fractures (8), horizontal, rough, undulating, tight					
2			153.3' - Fracture, horizontal, rough, undulating					
NR			154.5' - Fracture, horizontal, rough, planar, tight					
155	R16-NQ 5 ft 92%	56	2	154.6-155.1' - Fracture zone		159.0-162.5' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), fine to medium grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 30-40% of surface, dissolution cavities up to 3/8"x3/4" on 5% of surface, white mineral infill, some cavities 162.5-163.6' - very pale orange and mottled medium light gray, (10YR 8/2 and N6), strong HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous (very small <1/16" molds/casts) No Recovery 163.6-164.0' No Recovery 164.0-166.0'	R15:5 minutes	
1			155.5' - Fracture, 80 deg, slickensided, stepped, brown staining, tight					
7			156.85, 157.0, 157.6' - Fractures (3), horizontal, rough, undulating, open					
5			159.4, 159.5' - Fractures (2), rough, undulating, open 1/8"					
NR			160.9, 161.0, 161.1' - Bedding plane (3), <5 deg, rough, undulating, tight					
160	R17-HQ 2 ft 0%	0	1	161.2, 161.3' - Fracture or mechanical break (2), horizontal, rough, undulating, tight		Limestone 166.0-166.9' - moderate olive brown and light olive gray, (5Y 4/4 and 5Y 6/1), fine grained, strong HCl reaction, strong (R4), 30-40% medium grained medium gray (N5) particles, poorly fossiliferous (few casts), laminations at 166.0'	R16: No run time recorded	
1			161.5, 161.6, 161.7, 162.0, 162.1, 162.2' - Bedding plane (4), horizontal, rough, planar, tight					
7			162.6' - Bedding plane, horizontal, rough, undulating					
5			162.7, 163.0' - Mechanical break (2)					
NR			163.45' - Fracture, horizontal, rough, undulating, tight, open 1/8"					
164.0	R18-HQ 5 ft 70%	16	2	166.65' - Bedding plane, horizontal, rough, undulating, open			Driller's Remark: Driller switch to HQ core assembly and used a 2.0' stake on core run R17:1 minute	
1			166.9' - Bedding plane, horizontal, smooth, planar, open					
7			166.9-171.0' - Mechanical break, horizontal, smooth, planar, highly competent limestone intervals, related to drilling					
5			>10					
NR			>10					
166.0								
165								
166.0								
170								



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-11	SHEET 10 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 on 2/11/07 START : 2/7/2007 END : 2/12/2007 LOGGER : T. Stewart, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-127.1			NR			Limestone 166.9-169.5' - moderate olive brown, (5Y 4/4), medium to coarse grained, strong HCl reaction, weak (R2), 5-10% powder white mineral infill in voids and cavities, 166.9-167.2' and 167.6-168.0' is olive gray (5Y 6/1), fine matrix, microlaminated No Recovery 169.5-171.0' Limestone 171.0-171.9' - yellowish gray, (5Y 7/2), medium to coarse grained, strong HCl reaction, weak to medium strong (R2 to R3), 10-20% dissolution cavities up to 9/16"x3/8", up to 35% medium gray (N5) coarse-sized grains, poorly fossiliferous (trace casts), sharp contact 171.9-176.0' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), very poorly fossiliferous (trace casts), fine bedding laminations (1/16"x3/16") visible on fresh broken face 176.0-180.8' - Same as 171.9-176.0' except rippled laminations are visible over 179.0-180.5'	R18: No run time recorded	
175 -132.1	R19-HQ 5 ft 100%	56	1 3 2 2 2	171.7' - Mechanical break, horizontal, undulating, 1/4" x 5/16" relief, fossil molds exposed on surface 172.2' - Fracture, horizontal, smooth, undulating 172.4' - Fracture or mechanical break, <5 deg 172.5, 172.9, 173.6' - Bedding plane (3), horizontal, rough, undulating, open 3/16" 174.1' - Mechanical break or fracture, 70 deg, rough, undulating 175.1' - Mechanical break, horizontal, rough, undulating, irregular 175.3' - Mechanical break, horizontal, rough, undulating 175.4' - Bedding plane, horizontal, rough, undulating, open 1/8"x3/16" 176.4-176.6' - Fracture, horizontal, rough, clay/gravel interbed, clay infill 177.0, 177.1' - Fractures (2), horizontal, rough, undulating, clay infill 177.8' - Fracture or mechanical break, 70 deg, rough, undulating, closely spaced fracture 178.6' - Fracture, 45 deg, rough, undulating 179.0' - Mechanical break, horizontal, rough, undulating			R19:8 minutes	
180 -137.1	R20-HQ 5 ft 96%	32	1 7 5 NR	179.2, 179.3, 179.35' - Bedding plane (3), horizontal, rough, planar to undulating 179.6' - Mechanical break, 10-15 deg, clean, tight 179.7, 179.85' - Fracture (2), horizontal, rough, planar, dark brown staining 180.0' - Mechanical break, 0-5 deg, undulating, clean 180.1, 180.3' - Bedding plane (2), horizontal, rough, brown staining 180.6, 180.7' - Fractures (2), horizontal, rough, undulating, slight staining, no infill 181.2' - Fracture, fragmented limestone 181.5, 181.6, 181.7' - Fracture (3), fragmented limestone, horizontal planar breaks			R20: No run time recorded	
185 -142.1	R21-HQ 5 ft 90%	48	4 3 0 6 5 NR	182.0' - Bedding plane, horizontal, rough, planar, slight brown staining on fracture 182.5' - Fracture, rough, horizontal partings, cavity-rich limestone breaks (fragmented) 182.7' - Fracture, rough, irregular break 184.0' - Bedding plane, horizontal, smooth 184.05, 184.45, 184.50, 184.6' - Bedding plane (4), horizontal, smooth 184.95, 185.0, 185.05, 185.1' - Bedding plane (4), horizontal, smooth, fine spaced (3/8"x7/8")			R21: No run time recorded	
						Limestone 185.3-185.5' - dark brown, fossiliferous surface, voids on >60% of surface, molds and casts No Recovery 185.5-186.0' Bottom of Boring at 186.0 ft bgs on 2/12/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 1 OF 10
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
41.0	0.0	1.2	SS-1	1-3-3 (6)	Topsoil 0.0-0.2' Poorly Graded Sand (SP) 0.2-1.15' - grayish orange to moderate yellowish 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
	1.5						
5 36.0	5.0	0.7	SS-2	3-3-3 (6)	Clayey Sand (SC) 5.0-5.65' - light olive gray, (5Y 6/1), moist, loose, very fine to fine silica sand, 40-45% high plastic fines, trace fine gravel (possible concretion)		
10 31.0	10.0	0.4	SS-3	3-13-6 (19)	Silty Limestone Gravel With Sand (GM) 10.0-10.4' - yellowish gray, (5Y 8/4), wet, medium dense, strong HCl reaction, fine to coarse gravel-sized limestone, composed of mostly (<75%) 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		Driller's Remark: Lost circulation at 10.0' below ground surface Driller mixed thick mud, regain circulation
15 26.0	15.0	0.8	SS-4	32-50/4.5 (82/10.5")	Silty Limestone Gravel With Sand (GM) 15.0-15.8' - Same as 10.0-10.4' except moderately fossiliferous with 3/4"x3/16" size casts over 10-15% of the rock surface, light olive brown (5Y 5/6) staining on some face		Driller's Remark: Light chattering at 15.8' below ground surface
20	15.9						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 2 OF 10
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.0	20.0	1.2	SS-5	8-12-12 (24)	[Symbolic Log]	
	21.5					
25	25.0	1.5	SS-6	5-4-19 (23)	[Symbolic Log]	
16.0	26.5					
30	30.0	0.7	SS-7	46-50/5.5 (96/11.5")	[Symbolic Log]	
11.0	31.0					
35	35.0	0.8	SS-8	5-9-16 (25)	[Symbolic Log]	Driller's Remark: 36.5' below ground surface: hard rock
6.0	36.5					
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 3 OF 10
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
1.0	40.0	0.9	SS-9	15-22-41 (63)	<p>Silt With Sand And Limestone (ML) 40.0-40.9' - dusky yellow, (5Y 6/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 20-25% fine to coarse sand-sized, 10% fine to coarse gravel-sized limestone fragments, carbonate material, dark (possible organic) 1/4" thick layer at 40.45', yellowish gray (5Y 8/1) limestone fragment at top of sample (similar to SS-3 and SS-4)</p>	Driller's Remark: Lost 100 % circulation at 40.0' below ground surface; mixed thick mud and regained circulation
	41.5					
45 -4.0	45.0	1.2	SS-10	14-15-26 (41)			Silt With Sand (ML) 45.0-46.2' - yellowish gray, (5Y 7/2), wet, hard, low plasticity, rapid dilatancy, moderate to strong HCl reaction, 20% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, carbonate material
50 -9.0	50.0	1.3	SS-11	22-18-23 (41)	<p>Limestone Fragments 50.0-50.2' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction</p> <p>Silt With Sand (ML) 50.2-51.3' - moderate yellowish brown, (10YR 5/4), wet, hard, low plasticity, rapid dilatancy, strong HCl reaction, 20% fine to coarse sand-sized, trace fine gravel-sized limestone fragments, dark (possible organic), 1/4" thick layer at 50.8'</p>	
55 -14.0	55.0	1.5	SS-12	34-39-49 (88)	<p>Silt With Sand (ML) 55.0-56.5' - Same as 50.2-51.3' except increase in fine gravel-sized limestone with depth to 10%, trace dark (possible organic) mottling</p>	Driller's Remark: End of drilling at 56.5' below ground surface on 5/16/07 at 17:00 On 5/17/07 at 08:03, water level is at 3.5' below ground surface; at 08:15, begin cleaning hole and circulating mud
60	56.5					



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 4 OF 10
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-19.0	60.0	1.4	SS-13	24-27-38 (65)	| | | | |	
	61.5					
65 -24.0	65.0	1.3	SS-14	41-47-45 (92)	| | | | |	Driller's Remark: Increase in hardness of material at 68.0' below ground surface
	66.5					
70 -29.0	70.0 70.3	0.1	SS-15	50/3 (50/3")	| | | | |	
75 -34.0	75.0 75.1	0.1	SS-16	50/2 (50/2")	| | | | |	
80						



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 ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-34.0	75.0	43	4	75.15, 78.15, 78.55, 78.65, 78.8' - Bedding plane (5), horizontal, smooth, undulating, tight	Limestone 75.0-79.4' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), up to 1/8" voids cover 15-40% of surface, up to 3/16"x3/8" fossil casts, up to 3/16" thick dark (possible organic) lamination, voids cover 40% of surface below 78.3' with trace grayish hard infill to 9/16" diameter, trace <9/16" cavities throughout the core No Recovery 79.4-80.0'	Begin rock coring at 75'	
			3	75.6' - Bedding plane or mechanical break, 10 deg, smooth, undulating, open 1/2"			
			2	75.7' - Fracture, 80 deg, smooth, undulating, tight			
			4	75.95' - Bedding plane, horizontal, smooth, planar, tight			
			0	76.1' - Fracture, vertical, smooth, undulating, tight, vertical from 75.6-76.55'			
80	80.0	10	NR	76.55' - Bedding plane, horizontal, smooth, undulating, tight	Limestone 80.0-81.25' - Same as 75.0-79.4' except 3/4" thick brownish black (5YR 2/1) fat clay at 80.25-80.3' No Recovery 81.25-85.0'	R1:7 minutes	
-39.0			>10	76.85' - Mechanical break or fracture, 40 deg, smooth, undulating, tight			
			>1	77.2' - Fracture, 70 deg, smooth, undulating, tight			
			NR	77.35' - Fracture, 30 deg, smooth, undulating, tight			
			NR	80.0-80.25' - Fracture zone, fragments to 1"x1-1/2"			
85	85.0	73	2	80.25-80.3' - Clay seam, clay layer or infill	Limestone 85.0-88.7' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, moderate to strong HCl reaction, extremely weak to weak (R0 to R2), voids (up to 1/8") cover 25% of surface, moderately fossiliferous (casts and molds up to 3/16"-3/8"), 2"x1-3/8" cavities over 10% of surface, percentage of voids coverage decreases with depth 88.7-90.0' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, strong HCl reaction, weak to medium strong (R2 to R3), up to 1/8" voids cover 15% of surface, up to 3/8"x3/16" trace fossil casts, trace organic matter 90.0-92.5' - Same as 88.7-90.0' except trace cavities up to 1-3/16"x2", fossiliferous material with casts up to 3/8"x3/4", up to 2"x2-3/4" trace infill 92.5-94.85' - grayish orange, (10YR 7/4), fine to medium grained, strong HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover 5-15% of surface, trace dark (possible organic) material, carbonate material	R2:3 minutes	
			3	80.3' - Bedding plane, horizontal, smooth, planar, in contact with clay layer or infill			
			1	80.55' - Mechanical break or bedding plane, horizontal, smooth, stepped, tight			
			0	81.0-81.25' - Fracture zone, fragments to 1-3/4"x2"			
			1	85.4, 85.6, 86.3, 86.6, 86.8, 87.0' - Mechanical break (6), rough, undulating, associated with cavities, open 1/4"-2"			
90	90.0	85	0	89.8' - Fracture, 60 deg, smooth, undulating, tight	R3:6 minutes		
-49.0			1	91.65' - Bedding plane, horizontal, smooth, planar to stepped, tight			
			2	92.05' - Mechanical break, 10 deg, smooth, undulating, tight			
			1	92.8' - Fracture (2), 85 deg, smooth, undulating, intersecting, tight			
			>3	93.5' - Fracture or mechanical break, 10 deg, smooth, undulating, tight			
95	95.0			94.2' - Fracture, 70 deg, smooth, undulating, tight	R4:11 minutes		



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 on 05/17/2007 START : 5/16/2007 END : 5/19/2007 LOGGER : C. Wallested

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-54.0	R5-NQ 5 ft 82%	60	NR	94.5-94.55' - Fracture zone		No Recovery 94.85-95.0' Limestone 95.0-99.1' - grayish orange, (10YR 7/4), fine to medium grained, mild to moderate HCl reaction, weak (R2), voids (up to 3/16") cover 5-25% of the surface, trace dark (possible organic) mottling, extremely weak (R0) at 97.4-98.05', fossil casts (up to 3/8") over 5-10% of surface	Driller's Remark: Very crumbly feeling between 97.0-98.5' below ground surface; soft
1			95.05' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight				
0			97.0' - Fracture, 80 deg, smooth, undulating, tight				
>3			97.2' - Bedding plane, horizontal, smooth, planar, tight				
4			97.75-97.85' - Fracture zone, fragments to 2"				
100	R6-NQ 5 ft 98%	68	NR	98.0' - Fracture or mechanical break, 45 deg, rough, undulating, open to fracture zone		No Recovery 99.1-100.0' Limestone 100.0-104.9' - Same as 95.0-99.1' except no extremely weak (R0) zone	R5:7 minutes
0			98.15' - Bedding plane, <10 deg, smooth, undulating, dark stain on one face, open 1/2"				
2			98.45' - Bedding plane or mechanical break, <10 deg, smooth, undulating, tight				
3			98.8' - Fracture, 50 deg, rough, undulating				
2			100.85' - Fracture, 20 deg, smooth, undulating to planar, tight				
3			100.95' - Fracture, 70 deg, smooth, undulating to planar, tight, intersects fracture at 108.5'				
3			101.8' - Fracture, 40 deg, smooth, undulating, tight				
>2			101.9' - Fracture, 70 deg, smooth, undulating, tight				
>2			102.0' - Fracture, 20 deg, smooth, undulating, tight				
105			R7-NQ 5 ft 75%	26				NR	102.35' - Bedding plane, horizontal, smooth, undulating, tight		No Recovery 104.9-105.0' Limestone 105.0-108.75' - Same as 95.0-99.1' except moderate HCl reaction, extremely weak (R0) zone at 105.3-105.65' and 106.85-107.35'	Driller's Remark: Soft between 105.5-106.5' and 107.0-108.0'
>10	103.1' - Fracture, 65 deg, smooth, undulating, tight						
>2	103.45' - Fracture, 10 deg, smooth, undulating, tight						
>3	103.7' - Fracture, 20 deg, smooth, undulating, tight						
3	104.4-104.55' - Fracture zone, fragments to 1"x2"						
NR	104.55' - Fracture, 30 deg, smooth, undulating, tight, open to fracture zone						
NR	104.8' - Fracture, 80 deg, rough, undulating, tight						
110	R8-NQ 5 ft 100%	60	NR	105.0-105.4' - Fracture zone, fragments to 1-1/2"		No Recovery 108.75-110.0' Limestone 110.0-115.0' - Same as 95.0-99.1' except extremely weak (R0) zone at 110.8-111.3', 103.6-104.8' depth intervals, trace dark (possible organic) lamination, mild HCl reaction in weak (R2) zone, moderate HCl reaction in extremely weak (R0) zone	R7:6 minutes End of day on 05/17/2007 at 17:10 Begin coring on 05/18/2007 at 08:28
2			105.4' - Bedding plane or mechanical break, 20 deg, smooth, undulating, open to fracture zone				
2			105.8' - Fracture, 20 deg, smooth, undulating, tight				
1			105.9' - Fracture, 30 deg, smooth, undulating, tight to open 1/2"				
3			106.45' - Fracture, 20 deg, smooth, undulating, tight to open				
2			106.55' - Fracture, 60 deg, rough, undulating, tight to open				
115				106.85-107.35' - Fracture zone, fragments to 1/2"			Driller's Remark: Soft between 113.5-114.5' R8:7 minutes
				107.75-107.95' - Fracture zone, fragments to 1"x2"			



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 7 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-74.0	R9-NQ 5 ft 52%	10	3	108.4' - Fracture, 20 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 115.0-117.6' - moderate yellowish brown, (10YR 5/4), fine grained, mild 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, trace cavities up to 1/4", similar to 95.0-99.1' No Recovery 117.6-120.0'	R9:7 minutes
>3			108.6' - Fracture, 80 deg, smooth, undulating, tight, intersects fracture at 108.4'				
>10			110.05' - Fracture, 80 deg, smooth, undulating, tight, continues same fracture at 108.6'				
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, undulating, tight, intersects fracture at 111.2'				
120	R10-NQ 5 ft 68%	40	3	112.4' - Fracture or mechanical break, 65 deg, rough, undulating, tight	[Symbolic Log]	Limestone 120.0-121.5' - Same as 115.0-117.6' except extremely weak (R0) zone at 120.4-120.55' 121.5-122.35' - moderate yellowish brown, (10YR 5/4), fine to medium 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 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, 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 fossil casts No Recovery 123.4-125.0'	Driller's Remark: At 121.5', 100% loss of circulation R10:9 minutes
>3			113.35' - Fracture, 30 deg, smooth, undulating, tight				
1			113.4' - Fracture, 75 deg, smooth, undulating, tight, intersects fracture at 113.35'				
3			113.8' - Bedding plane or mechanical break, 10 deg, smooth, undulating, tight, top of extremely weak (R0) zone				
125	R11-NQ 5 ft 46%	0	NR	114.2' - Bedding plane or mechanical break, 10 deg, smooth, undulating, tight, middle of extremely weak (R0) zone	[Symbolic Log]	122.35-123.4' - moderate yellowish brown, (10YR 5/4), medium grained, 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 fossil casts No Recovery 123.4-125.0'	R11:6 minutes
>10			114.7-114.8' - Fracture zone, extremely weak (R0) zone				
>10			115.55' - Fracture, 70 deg, smooth, undulating, tight				
2			115.6' - Fracture, 20 deg, smooth, undulating, tight, intersects fracture at 115.55'				
130	R12-NQ 5 ft 10%	0	NR	115.9' - Fracture, 15 deg, smooth, undulating, tight	[Symbolic Log]	125.0-125.6' - Same as 95.0-99.1' except mild HCl 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' except weak to medium strong (R2 to R3) No Recovery 127.3-130.0'	Driller's Remark: Very soft between 131.5-134.0' R12:3 minutes
>10			116.2' - Fracture, 80 deg, smooth, undulating, tight				
NR			116.4-116.6' - Fracture zone, fragments to 1"x1-1/2"				
NR			116.75' - Fracture, 20 deg, smooth, undulating, tight				
135				117.05-117.6' - Fracture zone, fragments to 1"x1-1/2"			
				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, undulating, tight			
				120.6' - Fracture, 10 deg, smooth, undulating, tight			
				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			



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 8 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-94.0	R13-NQ 5 ft 56%	8	>10	123.3' - Bedding plane, horizontal, smooth, undulating, tight, voids and cast parallel to break	[Symbolic Log]	Limestone 135.0-137.8' - dark yellowish orange to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), medium grained, weak to medium strong (R2 to R3), voids (up to 3/16") over 5-15% of surface, casts (up to 3/16"x3/8") cover 5% of surface, 1" thick trace light gray fine grained infill at the end of run, no voids visible at 136.85-136.95' No Recovery 137.8-140.0'	R13:6 minutes	
>10			125.0-125.3, 125.6-125.7' - Fracture zone (2), fragments to 3/4"x1-1/2"					
2			126.1-126.4' - Fracture zone, fragments to 1"x2", many parallel horizontal bedding plane breaks					
NR			126.65' - Bedding plane, horizontal, smooth, undulating, tight 126.75' - Fracture, 70 deg, smooth, undulating, tight 127.0, 127.15' - Fracture (2), 10 deg, smooth, undulating, tight					
140 -99.0	R14-NQ 5 ft 66%	27	>10	130.-130.5' - Fracture zone, fragments to 1"x2" parallel to horizontal bedding planes in many places	[Symbolic Log]	Limestone 140.0-143.3' - pale yellowish brown with grayish orange mottling, (10YR 6/2 with 10YR 7/4), fine to medium grained, moderate HCl reaction, medium strong (R3), voids (up to 1/8") cover 5-15% of surface, cavities (up to 3/4"x9/16") over 5% of surface, casts (up to 1-3/16" size) cover 5-10% of surface, cavities filled with pale yellowish brown infill with voids over 30% of the infill; at 140.0-140.3' darker coarse grained and high percentage of void coverage No Recovery 143.3-145.0'	R14:17 minutes	
2			137.4' - Fracture, 20 deg, smooth, undulating					
>10			137.65' - Bedding plane, horizontal, smooth, undulating, open 1/4" 140.0-140.75' - Fracture zone, fragments to 2"x2"					
>1			141.85' - Fracture, 80 deg, smooth, undulating, tight 142.0' - Fracture, 10 deg, smooth, undulating, dark stain, tight 142.05-142.5' - Fracture zone, fragments to 1"x2"					
145 -104.0	R15-NQ 5 ft 52%	0	>10	142.85-142.95' - Fracture zone, 1" fragments	[Symbolic Log]	Limestone 145.0-147.6' - grayish orange, (10YR 7/4), fine grained, strong HCl reaction, medium strong (R3), trace voids (up to 1/16"), trace fossil casts (up to 1/8"x3/16"), trace dark laminations No Recovery 147.6-150.0'	Driller's Remark: Regained circulation at 149.0' R15:12 minutes	
8			143.1-143.3' - Fracture zone, fragments to 1"x2"					
>2			145.0-145.25' - Fracture zone, fragments to 1-1/2"x2" 145.35, 145.6, 146.15, 146.2, 146.3, 146.5, 146.7, 147.1, 147.35, 147.5, 147.5' - Bedding plane (10), horizontal, smooth, planar, tight 145.4' - Fracture, 45 deg, smooth, planar, tight					
NR			145.85-146.2' - Fracture zone, fragments to 2"x2-1/2", multiple high angle fractures and bedding planes 146.7' - Fracture, 65 deg, smooth, undulating, tight					
150 -109.0	R16-NQ 5 ft 78%	48	>4	147.35-147.6' - Fracture zone, fragments to 2"x2-1/2"	[Symbolic Log]	Limestone 150.0-151.3' - moderate yellowish brown, (10YR 5/4), coarse grained, mild HCl reaction, weak (R2), voids (up to 1/8") cover 30-35% of surface, no visible fossil or cavities 151.3-153.9' - Same as 145.0-147.6' except mild HCl reaction, voids cover 5-10% of surface and increase abruptly to 15-30% at 153.4', trace fossil casts (up to 3/16"x3/8"), rock strength decreases to weak rock (R2) at 153.4' and coverage by dark wavy laminations increases to 10% after 153.4'	Driller's Remark: Regained 100% circulation at 150.0'; water level 4.0' below ground surface at 13:30 Driller's Remark: At 151.0', circulation drops to 25% R16:10 minutes	
>2			150.1, 150.45, 150.65, 151.3, 151.7, 152.5, 152.6, 153.4, 153.55, 153.7, 153.8' - Bedding plane (11), horizontal, smooth, planar to undulating, tight to open 1/4"					
2			150.8-151.3' - Fracture zone, fragments to 1"x2"					
>4								
155	155.0		NR					



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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION			
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
-114.0	R17-NQ 5 ft 95%	34	3	155.15, 155.4, 155.8, 156.0, 156.4, 157.2, 157.25, 157.45, 157.6, 157.9, 158.1, 158.6, 158.7' - Bedding plane, horizontal, smooth, planar to undulating, tight to open 1/4"	[Symbolic Log]	No Recovery 153.9-155.0' Limestone 155.0-157.9' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover 5-15% of surface, trace cavities (up to 3/8") 157.9-158.5' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), very fine grained, strong HCl reaction, strong to very strong (R4 to R5), no voids or cavities 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 155.0-157.9' except voids (up to 1/16") coverage increasing to 25% No Recovery 159.75-160.0' Limestone 160.0-161.4' - Same as 155.0-157.9' except fossil casts to 3/8"x3/4" and voids cover 5-30% of surface 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' No Recovery 163.7-165.0'	Driller's Remark: Soft drilling at 158.5-159.0' R17:6 minutes
6			156.1' - Fracture, 45 deg, rough, undulating, tight				
>7			156.2' - Fracture, 45 deg, rough, undulating, open				
2			156.8' - Mechanical break or bedding plane, horizontal, rough, undulating, tight				
3			156.9, 156.95' - Fracture (2), 75 deg, rough, undulating, tight				
NR			157.6-157.8' - Fracture zone, fragments to 2"				
160	R18-NQ 5 ft 74%	52	>2	158.85' - Fracture, 30 deg, smooth, undulating, tight	[Symbolic Log]	No Recovery 159.75-160.0' Limestone 159.0-159.2' - Fracture zone, fragments to 3/4"x2" 160.0-160.4' - Fracture zone, fragments to 2"x1" 160.8, 161.3, 161.35, 161.55, 161.6, 161.7, 162.05, 162.95, 163.3' - Bedding plane, horizontal, smooth, planar, tight to open 1/4" 160.9' - Fracture, 70 deg, smooth, undulating, tight 161.3-161.35' - Fracture zone, fragments to 1/4"x2", mostly planar bedding plane	Driller's Remark: Very soft at 161.0-162.0' R18:5 minutes End of day on 5/18/07 at 17:35 Begin coring on 5/19/07 at 08:05
-119.0			>4	160.0-160.4' - Fracture zone, fragments to 2"x1"			
2			160.8, 161.3, 161.35, 161.55, 161.6, 161.7, 162.05, 162.95, 163.3' - Bedding plane, horizontal, smooth, planar, tight to open 1/4"				
1			160.9' - Fracture, 70 deg, smooth, undulating, tight				
NR			161.3-161.35' - Fracture zone, fragments to 1/4"x2", mostly planar bedding plane				
165			R19-NQ 5 ft 96%	28			
-124.0	>4	165.3' - Fracture, 80 deg, smooth, planar, open, fragments					
5	165.35, 165.4, 165.55, 165.7, 165.85, 166.45, 166.55, 166.65, 166.95, 167.1, 167.4, 167.6, 167.75' - Bedding plane (13), horizontal, smooth, planar, tight						
2	166.55-166.65' - Fracture zone, fragments to 1/4"x1", mostly planar, horizontal bedding plane						
4	168.0, 168.1' - Fracture (2), 10 deg, smooth, planar, tight						
NR	168.35' - Fracture, 45 deg, smooth, undulating, tight						
170	R20-NQ 5 ft 100%	69	5	169.1' - Fracture, 35 deg, smooth, undulating, tight	[Symbolic Log]	Limestone 165.0-167.8' - repeated alternating transitions between moderate yellowish brown and pale yellowish brown, (10YR 5/4 and 10YR 6/2), moderate HCl reaction, medium strong to strong (R3 to R4), pale yellowish brown material is very fine grained and stronger, with no voids, moderate yellowish brown material is fine grained with 20-30% voids, 5% medium grained gray limestone imbedded in the matrix of the moderate yellowish brown material (possible infill), gradual transition to limestone at 167.8-169.8' 167.8-169.8' - yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine to medium grained, moderate HCl reaction, medium strong (R3), voids (up to 1/8") over 5-25% of surface, fossil casts (up to 3/16"x3/8") over 10% of surface, trace dark grey infill (to 1/8"x1"), delayed HCl reaction No Recovery 169.8-170.0'	R20:7 minutes
-129.0			>3	169.1' - Fracture, 35 deg, smooth, undulating, tight			
2			169.3' - Fracture, 60 deg, smooth, undulating, tight				
1			169.55' - Fracture, 60 deg, smooth, undulating, tight				
4			169.6' - Fracture, 10 deg, smooth, undulating, tight				
NR			170.35, 170.75, 170.85, 170.9, 171.1, 171.55, 174.05' - Bedding plane (7), horizontal, smooth, planar, tight except by fracture zone				
175			170.7' - Fracture, 80 deg, smooth, undulating, tight				
			171.55-171.9' - Fracture zone, fragments to 1"x2-1/2"				



PROJECT NUMBER: 338884.FL	BORING NUMBER: GSC-12	SHEET 10 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-134.0	R21-NQ 5 ft 80%	55	1	171.9' - Fracture, rough, undulating, open by fracture zone	[Symbolic Log]	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', except trace cavities to 3/16"x1-9/16", cavities are mostly parallel to bedding, sequences run 176.4-177.25', 177.25-177.7', 177.7-178.55', and 178.55-179.0' No Recovery 179.0-180.0' Limestone 180.0-182.2' - Same as 167.8-169.8' except trace fossil casts and trace dark laminations 182.2-184.6' - Same as 165.0-167.8' except poorly competent, extremely weak (R0) at 182.55-182.75' 184.6-185.0' - Same as 165.0-167.8'	R21:7 minutes	
			3	172.25' - Fracture, 30 deg, smooth, undulating, tight				
			>7	172.7' - Fracture, 20 deg, smooth, undulating, tight				
			10	173.7' - Bedding plane, <5 deg, smooth, undulating, dark stain, tight				
			NR	174.6, 174.65' - Fracture (2), 50 deg, smooth, undulating, tight				
180	R22-NQ 5 ft 100%	80		175.4, 176.35, 176.38, 176.4, 177.05, 177.15, 177.25, 177.55, 177.6, 177.85, 178.3, 178.32, 178.4, 178.45, 178.49, 178.5, 178.51, 178.53' - Bedding plane (18), horizontal, smooth, planar, tight				
-139.0				177.2' - Fracture, vertical, smooth, undulating, missing opposite faces				
				3	177.55-177.6' - Fracture zone, fragments to 1/4"x1/2"			
				1	178.9, 178.95' - Fracture (2), 75 deg, smooth, undulating, tight			
				2	180.05, 181.7, 182.55, 182.75' - Bedding plane, horizontal, smooth, planar to undulating, tight to open 1/4"			
			0	180.4' - Fracture, 70 deg, smooth, undulating, missing face				
			1	180.75' - Fracture, 60 deg, smooth, undulating, tight to open 1/2"			R22:9 minutes	
185				184.65' - Fracture, 25 deg, smooth, undulating, dark stain, tight				
-144.0							Bottom of Boring at 185.0 ft bgs on 5/19/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.5	0.0			<p>Poorly Graded Sand (SP) 0.0-1.3' - gray, (N3), moist to wet, fine grained, silica sand, trace nonplastic fines</p> <p>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</p> <p>Silty Sand (SM) 3.0-4.0' - dark yellowish orange, (10YR 6/6), wet, fine grained, silica sand, with nonplastic to low plasticity fines</p> <p>Sandy Silt/sandy Lean Clay (CL-ML) 4.0-4.5' - yellowish gray, (5Y 7/2), moist, low to medium plasticity, blocky, with fine grained silica sand</p> <p>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</p> <p>Silt (ML) 5.0-13.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, carbonate materials</p>		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels were not recorded for I-01
5 37.5	6.0	R1-SN				
10 32.5	6.0			<p>Silt (ML) 5.0-13.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, carbonate materials</p>		
15 27.5	10.0	R2-SN		<p>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</p>		
16.0				16.0-19.0' - Same as 13.0-16.0' except greater percentage of silt (up to 60%)		
20				<p>Limestone 19.0-19.5' - very pale orange, (10YR 8/2), full core-diameter (4") fragments 1" thick</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 2 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 METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.5	10.0	R3-SN		Sandy Silt (ML) 19.5-24.5' - pale yellowish brown, (10YR 6/2), moist to wet, nonplastic to low plasticity, blocky, all carbonate materials		
25 17.5				Limestone Fragments 24.5-26.0' - very pale orange, (10YR 8/2), fossiliferous, fragments up to 3"-4"		Top of rock estimated to be approximately 26.0' below ground surface
30 12.5				Begin Rock Coring at 26.0 ft bgs See the next sheet for the rock core log		
35 7.5						
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 3 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
26.0	R4-SN 10 ft 70%	NA	NA	[Symbolic Log]	Limestone 26.0-29.7' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl 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 HCl reaction, non fossiliferous, full core-diameter fragments up to 2" thick No Recovery 33.0-36.0'	Set 8" casing to 28" with bentonite around between 8" to 6" casing NA = Not Applicable NR = No Recovery Coring run times not recorded for I-01	
30 12.5							26.0-36.0' - NA
35 7.5	R5-SN 10 ft 75%	NA	NA	[Symbolic Log]	Limestone 36.0-38.0' - dark yellowish brown, (10YR 4/2), dry, moderate HCl 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 HCl reaction, silt to fine gravel-sized limestone fragments No Recovery 43.5-46.0'	SC-1 collected at 36.0-37.3'	
36.0							36.0-46.0' - NA
40 2.5							
45 -2.5							
46.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 4 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
50 -7.5	R6-SN 10 ft 100%	NA	NA		Limestone 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 HCl 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"	SC-2 collected at 46.0-46.7'	
55 -12.5	56.0				Silt (ML) 53.0-56.0' - moderate yellowish brown, (10YR 5/4), nonplastic, mild to moderate HCl reaction		
60 -17.5	R7-SN 10 ft 93%	NA	NA		Limestone Fragments 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 HCl reaction, unconsolidated material, <20% silt at 58.8' Limestone Fragments 58.8-61.0' - Same as 56.0-57.0'		
65 -22.5	66.0		NR		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 HCl reaction, very weak to weak (R1 to R2), 50-70% voids <1/16", cavities to 3/8" over 10-15% of surface, fossiliferous No Recovery 65.3-66.0'	SC-3 collected at 63.0-63.9' End drilling for the day; R8 is down-hole, will retrieve in morning	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 5 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

CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
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	
75 -32.5					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	SC-4 collected at 68.4-69.3'	
76.0					Silty Clay (CL) 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)		
80 -37.5	R9-SN 10 ft 75%	NA	NA		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			NR		Limestone Fragments 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'		
86.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 6 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
90 -47.5	R10-SN 10 ft 100%	NA	NA	<p>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")</p> <p>Limestone 89.1-89.7' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction</p> <p>Clay (CH) 89.7-90.7' - moderate yellowish brown, (10YR 4/2), dry to moist, very stiff, with silt (ML), blocky partings</p> <p>Limestone Fragments 90.7-93.0' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, fragments up to 3/4"</p> <p>Clayey Silt (ML) 93.0-94.0' - light brown, (5YR 5/6), dry to moist, strong HCl reaction, carbonate matrix</p> <p>Limestone Fragments 94.0-96.0' - sand to gravel-sized fragments, weak (R0), fossiliferous (molds/casts/shell fragments)</p>			
95 -52.5				<p>96.0</p> <p>Limestone Fragments 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%)</p> <p>Lignite 99.0-99.2' - extremely weak (R0), black organic partings</p> <p>Limestone 99.2-101.0' - Same as 96.0-99.0'</p>			
100 -57.5	R11-SN 10 ft 100%	NA	NA	<p>Clayey Silt (ML) 101.0-103.0' - dry, very stiff, low to medium plasticity, strong HCl reaction, blocky partings</p> <p>Limestone 103.0-105.0' - Same as 96.0-99.0'</p>			
105 -62.5				<p>106.0</p> <p>105.0-105.1' - very pale orange, (10YR 8/2), very fine grained, poorly fossiliferous (<10% coverage)</p>			



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 7 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
110 -67.5	R12-SN 10 ft 100%	NA	NA	<p>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</p> <p>109.5-114.0' - very fine to fine grained, sand to gravel-sized fragments, non fossiliferous</p>			
115 -72.5	116.0						
120 -77.5	R13-SN 10 ft 100%	NA	NA	<p>114.0-114.2' - dark yellowish brown, (10YR 4/2), strong HCl reaction, laminated bedding 114.2-121.0' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCl reaction, 20-30% gravel-sized and 70-80% fines, fragments up to 2"</p> <p>Disaggregated Limestone 121.0-126.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, with sand-sized to fine gravel-sized limestone fragments</p>	Rock disaggregated due to sonic drilling method		
125 -82.5	126.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 8 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

CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
130 -87.5	R14-SN 10 ft 100%	NA	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 HCl 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'		
135 -92.5					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'		
140 -97.5	R15-SN 10 ft 100%	NA	NA		Silty Clay (CL) 142.5-143.0' - moderate brown, (5YR 4/4), dry, low plasticity, blocky partings		
145 -102.5					Limestone 143.0-146.0' - Same as 126.0-136.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 9 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
150 -107.5	R16-SN 10 ft 88%	NA	NA		Limestone 146.0-148.7' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, strong to very strong (R4 to R5), <1/16" voids over <10% of surface, trace fossils 148.7-151.0' - strong HCl reaction, silt to fine gravel-sized limestone fragments 151.0-151.9' - strong HCl reaction, very weak to weak (R1 to R2), very fossiliferous 151.9-154.0' - Same as 148.7-151.0'	SC-6 collected at 146.3-147.2'	
155 -112.5			NR		Limestone Fragments 154.0-154.8' - strong HCl reaction No Recovery 154.8-156.0'		
160 -117.5	R17-SN 10 ft 100%	NA	NA		Disaggregated Limestone 156.0-161.6' - pale yellowish brown, (10YR 6/2), strong HCl reaction, silt to coarse gravel-sized limestone fragments Limestone 161.6-161.8' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, medium strong to strong (R3 to R4), non fossiliferous Disaggregated Limestone 161.8-163.0' - strong HCl reaction, carbonate materials Limestone Fragments 163.0-165.7' - moderate brown, (5YR 4/4), fine grained with silt, silt to 1" size limestone fragments		
165 -122.5							



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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
170 -127.5	R18-SN 10 ft 100%	NA	NA		<p>Limestone 165.7-166.0' - moderate brown, (5YR 4/4), fine grained, weak to medium strong (R2 to R3), fossiliferous</p> <p>166.0-170.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, sand to gravel-sized fragments, trace laminated bedding with mild HCl reaction</p> <p>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)</p> <p>172.0-173.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, rock-floor, silty matrix, sand to coarse gravel-sized fragments</p> <p>173.7-174.2' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCl reaction, medium strong to strong (R3 to R4), laminated</p> <p>Disaggregated Limestone 174.2-176.0' - mild HCl reaction, up to 3/4" gravel-sized pieces of compacted silt and limestone</p> <p>Limestone 176.0-179.5' - Same as 126.0-136.0' except core fragments up to 2-1/2"</p>		
175 -132.5	176.0						
180 -137.5	R19-SN 10 ft 100%	NA	NA		<p>176.0-186.0' - NA</p> <p>179.5-180.6' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, silt to fragments, soil like properties</p> <p>180.6-183.0' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCl reaction, shell fragments, molds, casts, 30-40% cavities to 3/8" in size</p> <p>183.0-184.5' - Same as 179.5-180.6'</p> <p>184.5-185.2' - Same as 176.0-179.5'</p> <p>185.2-185.5' - Same as 180.6-183.0'</p> <p>185.5-185.7' - Same as 183.0-184.5'</p>		
185 -142.5	186.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 11 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
190 -147.5	R20-SN 10 ft 100%	NA	NA		Limestone 185.7-186.0' - Same as 176.0-179.5' 186.0-196.0' - moderate yellowish brown, (10YR 5/4), medium to coarse grained, mild to moderate HCl reaction, sand to gravel-sized fragments, fossiliferous, cavities up to 3/16" over 30-50% of surface at 186.6-186.8'		
195 -152.5							
196.0							
200 -157.5	R21-SN 10 ft 58%	NA	NA		196.0-201.8' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), strong HCl reaction, blocky partings, silt to gravel-sized limestone fragments, friable		
205 -162.5			NR		No Recovery 201.8-206.0'		
206.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 12 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

CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
210 -167.5	R22-SN 10 ft 100%	NA	NA		Limestone 206.0-216.0' - Same as 196.0-201.8'		
215 -172.5							
220 -177.5	R23-SN 10 ft 100%	NA	NA		216.0-223.0' - Same as 196.0-201.8'		
225 -182.5					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: 338884.FL	BORING NUMBER: I-01	SHEET 13 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
 CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
230 -187.5	R24-SN 10 ft 100%	NA	NA		Limestone 226.0-233.0' - very pale orange, (10YR 8/2), fine grained, strong HCl reaction, extremely weak (R0), sand to coarse gravel-sized fragments, friable		
235 -192.5					233.0-236.0' - Same as 226.0-233.0' except increase in dark yellowish brown (10YR 4/2) silt		
240 -197.5	R25-SN 10 ft 100%	NA	NA		236.0-246.0' - Same as 226.0-233.0'		
245 -202.5							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01	SHEET 14 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

CORING 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 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
250 -207.5	R26-SN 10 ft 100%	NA	NA		Limestone 246.0-255.7' - Same as 226.0-233.0'		
255 -212.5							
256.0							
256.0					Silt (ML) 255.7-256.0' - grayish orange, (10YR 7/4), strong HCl reaction, unconsolidated material, silt to sand grain-sized		
256.0-266.0'					Limestone 256.0-265.7' - Same as 226.0-233.0'		
260 -217.5	R27-SN 10 ft 97%	NA	NA				
265 -222.5							
266.0			NR		No Recovery 265.7-266.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-01
SHEET 15 OF 15	
<h2 style="margin: 0;">ROCK CORE LOG</h2>	

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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/20/2007 END : 2/22/2007 LOGGER : R. Gomez

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES			SYMBOLIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	FRACTURES PER FOOT	DESCRIPTION		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.
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
						Bottom of Boring at 266.0 ft bgs on 2/22/2007	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 1 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
 DRILLING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.3	0.0			Topsoil 0.0-1.0'		Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)"
	6.4	R1-SN		Poorly Graded Sand (SP) 1.0-5.4' - light gray to medium gray, (N7 to N5), medium to coarse grained, with variable iron oxide staining, silica sand		Water levels were not recorded for I-02
5 37.3	7.0			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'		
				Sandy Silt (ML) 7.0-9.0' - Same as 5.4-6.4'		
10 32.3	10.0	R2-SN		9.0-15.0' - grayish yellow to yellowish gray, (5Y 7/2 to 5Y 8/4), moist, nonplastic to low plasticity, some fine to coarse sand-size and gravel-size, some "clasts" <1" size at 9.5-10.5', all carbonate material		
15 27.3	17.0			Limestone Fragments With Silt 15.0-17.0' - fragments are 1"-3" diameter, making up >50% of sample, with silt <50% of soil, all carbonate materials (soil may be thin limestone beds with silty interbeds)	Possibly drill induced breakage	
20				Silty Sand With Limestone Fragments (SM) 17.0-22.0' - yellowish gray, (5Y 7/2), moist, fine to coarse grained, grades to sandy silt with depth, <10% fine to coarse gravel-sized (<1/2") limestone clasts, all carbonate materials		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.3	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)		Possibly drill induced breakage (breaks without infilling of fines)
25 17.3			Silty Sand With Limestone Fragments (SM) 23.6-27.0' - grayish orange, (10YR 7/4), fine to coarse grained, strong HCl reaction, 10-20% fine to coarse gravel-sized limestone fragments (1/4"-1-1/4")			
27.0	7.8	R4-SN		Limestone Fragments 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		Possibly drill induced breakage
30 12.3			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			
35 7.3			Limestone Fragments 31.4-31.7' - yellowish gray, (5Y 8/1), moderate HCl 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 HCl 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
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.3	10.0	R5-SN		<p>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</p>		
45 -2.7	47.0			<p>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</p> <p>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 materials</p>		Difficulty driving 6" casing to 51.0' below ground surface
50 -7.7	6.2	R6-SN		<p>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</p>		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		
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 4 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
53.2					Limestone 53.2-57.0' - yellowish brown to gray, moderate to strong HCl reaction, light gray silty clay interbed/infill material on horizontal parting surfaces spaced 1"-2" with few up to 4", medium yellowish brown silt (<15%) 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	Start of rock core	
55 -12.7	R6-SN 3.8 ft 100%	NA	NA			Coring run times not recorded for I-02	
57.0					Limestone Fragments 57.0-59.5' - strong HCl reaction, angular to subangular fragments 1-3" in diameter, <40% carbonate derived clayey silt, fines change color from light gray to moderate yellowish brown at 58.0'	Highly fragmented limestone Possibly drill induced breakage	
60 -17.7	R7-SN 10 ft 100%	NA	NA		Limestone 59.5-63.0' - moderate yellowish brown, (10YR 5/4), horizontal partings 1"-2" spacing with dark grayish brown clayey silt interbed material rough and undulating, fine black laminar inclusions 1/16"-1/8" in length (horizontal)	NA = Not Applicable NR = No Recovery	
65 -22.7					63.0-64.7' - yellowish gray to olive gray, fine grained, trace to no fossils, few small surface voids (1/16"-1/8"), horizontal partings at various spacing from 1"-8", parting surfaces mostly clean with trace silty clayey material	Possibly drill induced breakage	
67.0					Silt (ML) 64.7-65.5' - dark brown, black mottling/laminations, possibly organics, possible bioturbation		
70 -27.7	R8-SN 10 ft 100%	NA	NA		Limestone 65.5-68.1' - grayish yellow brown, medium strong (R3), fossiliferous, horizontal partings with 2"-4" spacing, trace to no infill in partings, surface coverage of small (<1/8") voids >50%	Possibly drill induced breakage	
					Silt With Limestone Fragments (ML) 68.1-68.8' - orange gray, limestone fragments 1/2"-1" diameter	Possibly drill induced breakage Repeating limestone/silt interbeds	
					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 gray silty infilling (interbeds)		
					Silt (ML) 70.0-70.5' - Same as 68.1-68.8' except strong HCl reaction		



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
75 -32.7					Limestone 70.5-74.2' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium strong (R3), moderately fossiliferous (molds/casts), 2"-8" horizontal partings, 1"-2" thick semi-indurated gray silty interbeds (dry), dry powdery interbed material at 73.0' 74.2-75.9' - dusky orange to gray, fragmented, fine sand-sized material (carbonate derived) with sparse 1/2" limestone clasts, few fine black organic laminations 75.9-76.5' - dark gray, strong HCl reaction, fossiliferous, large solution cavities (1"x3"), interconnected rounded cavities (possible tube borings) Silt (ML) 76.5-77.0' - light gray to tan, laminated		
80 -37.7	R9-SN 10 ft 93%	NA	NA		Limestone 77.0-81.5' - moderate yellowish brown, (10YR 5/4), dense, moderate HCl reaction, medium strong to strong (R3 to R4), small surface voids (1/16"-1/8") covering 40-50% surface, limestone parting (horizontal) 2"-6" thick, gray clayey silt interbeds, clay zone 78.5-79.6' (dark brown /black interbed laminations, vitreous luster when rubbed with hand, organic) 81.5-82.3' - pale yellowish brown, (10YR 6/2), fine grained, medium strong (R3), few small surface voids, (1/16"-1/8") (<10%), few fossils Limestone Fragments 82.3-84.2' - moderate HCl reaction, gravel sized fragments (1/4"-1-1/2"), smaller fragments are subangular to subrounded, larger fragments angular to subangular Limestone 84.2-86.3' - pale yellowish brown to yellowish brown, (10YR 6/2 to 10YR 5/4), small surface voids (<1/8") covering 50% of surface, 5-10% small (<1/2") roughly circular cavities, light gray silty clay infilling on horizontal partings vary from 1"-9", increasing fossils (mostly molds) with depth No Recovery 86.3-87.0' Disaggregated Limestone 87.0-91.4' - mottled gray/tan/brown, moderate HCl reaction, <20% limestone fragments (<3/4"), few fragments >1-1/2"	Possibly drill induced breakage	
85 -42.7							
90 -47.7	R10-SN 10 ft 100%	NA	NA				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 6 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
95 -52.7					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	
100 -57.7	R11-SN 10 ft 100%	NA	NA	97.0-107.0' - NA			
105 -62.7							
110 -67.7	R12-SN 10 ft 100%	NA	NA	107.0-117.0' - NA	107.0-117.0' - Same as 97.0-107.0'		



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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
115 -72.7							
117.0							
120 -77.7	R13-SN 10 ft 100%	NA	NA		Limestone Fragments 117.0-127.0' - Same as 97.0-107.0'		
125 -82.7							
127.0							
130 -87.7	R14-SN 10 ft 100%	NA	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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
135 -92.7							
	137.0				Limestone Fragments 137.0-139.5' - Same as 97.0-107.0'		
140 -97.7	R15-SN 10 ft 100%	NA	NA		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 HCl reaction, dense, less fossiliferous than above, few surface voids/cavities (<10%), horizontal partings 2"-4" spacing, 2"-3" semi-compacted clayey silt interbeds	Fossiliferous, partial recrystallization (very fine subhedral/cross faces)	
145 -102.7					Disaggregated Limestone 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")		
	147.0				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)	
150 -107.7	R16-SN 10 ft 100%	NA	NA				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 10 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
175 -132.7	177.0		NR		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 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	Possibly drill induced breakage	
180 -137.7	R19-SN 10 ft 100%	NA	NA		177.0-187.0' - NA	Possibly drill induced breakage	
185 -142.7	187.0				187.0-189.0' - fragmented, angular to subangular, 1-1/2"-3" size	Possibly drill induced breakage	
190 -147.7	R20-SN 10 ft 81%	NA	NA		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	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 11 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
195 -152.7			NR		No Recovery 195.1-197.0'		
197.0							
200 -157.7	R21-SN 10 ft 74%	NA	NA		Limestone Fragments 197.0-203.3' - medium to coarse grained, grain size increasing with depth, limestone fragments are 2"-4" size, subangular to angular, fragments above 200' are fine grained, exhibit bedding plane fractures and have trace to no surface voids, fragments below 200.0' are fossiliferous (molds/casts) and exhibit 30-40% small (1/16"-1/8") surface voids and small cavities (<1/2")		
205 -162.7			NR		Disaggregated Limestone 203.3-204.4' - yellowish gray/moderate brown, 25% limestone fragments No Recovery 204.4-207.0'	Lost material may be fines from across entire run	
207.0							
210 -167.7	R22-SN 10 ft 87%	NA	NA		Limestone Fragments 207.0-215.7' - mild HCl reaction, variable (5-15%) clay-sized pasty limestone, limestone is fine grained, fossiliferous with 1/2"-3/4" cavities, fragments are angular to subangular with smooth to irregular surfaces, 6" clayey layers at 211.0' and 215.7', silt and clay-sized carbonate content decrease with depth	Possibly drill induced breakage	



PROJECT NUMBER: 338884.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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
215 -172.7							
			NR		No Recovery 215.7-217.0'		
217.0							
					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		
220 -177.7	R23-SN 10 ft 90%	NA	NA		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 strong HCl reaction fossiliferous, (molds & casts), mostly subangular, few subrounded fragments		
225 -182.7							
			NR		No Recovery 226.0-227.0'		
227.0							
					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)		
230 -187.7	R24-SN 10 ft 100%	NA	NA				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 13 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
235 -192.7							
	237.0						
240 -197.7	R25-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone 235.5-236.5' - orange gray/moderate brown, contorted laminations, organics</p> <p>Limestone 236.5-237.0' - light yellowish gray, fine grained, very weak (R1), thinly bedded (1/4"-1/2" thick), well developed bedding planes, appears similar to silt material</p> <p>Limestone Fragments 237.0-247.0' - grayish orange and yellowish gray, (10YR 7/4 and 5Y 7/2), very fine to medium grained, moderate to mild HCl reaction, two zones with organic laminations (3"-4" thick), gravel-sized material is subangular, size varies from 1/4"-2"</p>		
245 -202.7							
	247.0						
250 -207.7	R26-SN 10 ft 87%	NA	NA		<p>247.0-255.7' - grayish orange and very pale orange, (10YR 7/4 and 10YR 8/2), mild HCl reaction, limestone fragments are sand to gravel-sized, angular, up to 3", with zones of fragments that appear to have been possibly laminated prior to drilling</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 14 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
255 -212.7					No Recovery 255.7-257.0'		
257.0		NR					
260 -217.7	R27-SN 10 ft 100%	NA	NA		Limestone Fragments 257.0-268.5' - Same as 247.0-255.7'		
265 -222.7							
267.0							
270 -227.7	R28-SN 10 ft 100%	NA	NA		268.5-271.5' - very pale orange, (10YR 8/2), mild to moderate HCl reaction, laminated with organic layers in top 6", limestone fragments are angular to subangular, average 1/4"-1/2" size		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 15 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
275 -232.7					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		
277.0					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		
280 -237.7					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"		
285 -242.7	R29-SN 10 ft 87%	NA	NA		No Recovery 285.7-287.0'		
287.0					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')	
290 -247.7							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 16 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
295 -252.7	R30-SN 15 ft 67%	NA					
					No Recovery 297.0-302.0'		
300 -257.7			NR				
					Limestone Fragments 302.0-302.75' - Same as 287.0-297.0' 302.75-305.75' - grayish orange, (10YR 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	
305 -262.7			NA		305.75-306.5' - very pale orange and dusky blue green, (10YR 8/2 and 5BG 3/2), very little to reaction with HCl without scratching the surface, angular to subangular limestone No Recovery 306.5-317.0'		
					307.0-317.0' - NA		
310 -267.7	R31-SN 15 ft 30%	NA					
			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-02	SHEET 17 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.65 bgs on 3/6/07 START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
315 -272.7							
	317.0				Bottom of Boring at 317.0 ft bgs on 2/26/2007	Total depth of boring is 317.0'	



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.1	0.0			Poorly Graded Sand (SP) 0.0-3.0' - fine to medium grained, no HCl reaction, brownish black (5YR 2/1) and organic rich from 0.0-1.0' (topsoil) grading to pale brown (5YR 5/2) to dark yellowish brown (10YR 4/2) between 2.0-3.0'	Start drilling 12:32 Set 8" casing 0-27' below ground surface Water level: 2 ft below ground surface R1: 2 minutes	
5	5.4	R1-SN	Clayey Sand (SC) 3.0-6.0' - medium plasticity, no HCl reaction, fine silica sand, finely laminated with dark yellowish orange (10YR 6/6) layers and light gray (N7) layers			
37.1	6.0		Silt With Sand (ML) 6.0-16.0' - grayish orange, (10YR 7/4), mild to strong HCl reaction, very fine to fine sand-sized particles, 2-1/2" limestone fragments at 15.8', carbonate materials			
10	10.0	R2-SN			R2: 10 minutes	
15	16.0			Limestone 16.0-17.5' - very pale orange, (10YR 8/2), fossiliferous with molds/casts. Fossils exhibit preferential horizontal orientation (bedding plane), few large molds (3/4"), numerous small voids (3/8" to 1-3/16") over 40% of surface. Horizontal partings (1-4") with clay/silt interbeds up to 2" thick, partings may be mechanical breaks	5 bolts sheared off on drill head. Down for maintenance 12:55-15:13 (2:18)	
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
22.1	8.6	R3-SN		<p>Silty Sand With Limestone Fragments (SM) 17.5-24.6' - very pale orange, (10YR 8/2), fine-coarse sand-sized materials and variable fines content ranging from <5% to >15%. Limestone fragments are similar to limestone above and are subangular to subrounded in shape. Most fragments <0.5" with few large fragments >2" on 2.0-3.0' spacing (thin beds)</p> <p>No Recovery 24.6-26.0'</p>		R3: 20 minutes
25 17.1	26.0			<p>Silty Sand And Limestone Fragments (SM) 26.0-27.2' - Same as 17.5-24.6'</p> <p>Limestone 27.2-28.1' - Same as 26.0-27.2 except thin beds (1-2" thick) with clay/silt interbeds (1-1/2" thick)</p> <p>Silty Sand And Limestone Fragments (SM) 28.1-36.0' - moderate yellowish brown, (10YR 5/4), fine to coarse sand-sized materials, 20-40% fine to coarse gravel-sized limestone fragments, range from 3/4"-1-1/2" with few >2"</p>		Drill induced breakage
30 12.1	10.0	R4-SN				R4: 12 minutes
35 7.1				Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log		
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 3 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
36.0	R5-SN 10 ft 89%	NA	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)	NA = Not Applicable NR = No Recovery R5: 13 minutes	
40 2.1									Silt (ML) 39.6-41.0' - moderate yellow brown, (10YR 5/4), mild to moderate HCl reaction
45 -2.9				Well Graded Limestone Fragments With Sand 41.0-43.0' - limestone fragments <1". At 41.0' large, irregularly shaped limestone fragment (5")			
46.0	R6-SN 10 ft 96%	NA	NR		Limestone 43.0-44.9' - Same as 36.0-39.6' except with very thin clayey silt infilling on horizontal parting surfaces (bedding planes)	R6: 14 minutes	
50 -7.9								No Recovery 44.9-46.0'
55 -12.9				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			
56.0			NR		No Recovery 55.6-56.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 4 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
60 -17.9	R7-SN 10 ft 100%	NA	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"	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
65 -22.9					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
66.0					Limestone 66.0-68.6' - medium to coarse grained, voids (<1/16") over 80% of surface	Core run times not recorded below R7-SN	
70 -27.9	R8-SN 10 ft 85%	NA	NA		Limestone Fragments 68.6-70.1' Limestone 70.1-71.5' Limestone Fragments 71.5-72.5'		
75 -32.9			NR		Disaggregated Limestone 72.5-74.5' - contains limestone fragments No Recovery 74.5-76.0'		
76.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 5 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -37.9	R9-SN 10 ft 100%	NA	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 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 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		
85 -42.9	86.0				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' 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 gravel-sized Limestone Fragments 92.4-95.0' - very pale orange, (10YR 8/2), strong HCl reaction, limestone disc up to 5" in length with thin clay interbeds, trace voids on surface, apparent non-fossiliferous, rock is dry and powdery 95.0-96.0' - Same as 92.4-95.0' except with thin beds of dry lean clay		
90 -47.9	R10-SN 10 ft 100%	NA	NA				
95 -52.9	96.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 6 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -57.9	R11-SN 10 ft 100%	NA	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'		
105 -62.9							
106.0					106.0-116.0' - very pale orange, (10YR 8/2), strong HCl reaction		
110 -67.9	R12-SN 10 ft 100%	NA	NA				
115 -72.9							
116.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 7 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -77.9	R13-SN 10 ft 100%	NA	NA		Disaggregated Limestone 116.0-126.0' - Same as 106.0-116.0'		
125 -82.9	126.0		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
130 -87.9	R14-SN 10 ft 85%	NA	NA				No Recovery 134.3-136.0'
135 -92.9	136.0		NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 8 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -97.9	R15-SN 10 ft 93%	NA	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 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'	SC-1 collected at 144.2-145.3'	
145 -102.9	146.0		NR		Limestone Fragments 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 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		
150 -107.9	R16-SN 10 ft 100%	NA	NA				
155 -112.9	156.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 9 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -117.9	R17-SN 10 ft 100%	NA	NA		Disaggregated Limestone 156.0-166.0' - yellowish gray, (5Y 7/2), strong HCl reaction, contains isolated limestone fragments up to 3" in diameter		
165 -122.9					Limestone 163.7-166.0' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, limestone fragments up to 1" in length with interbedded silty sand, poorly fossiliferous		
170 -127.9					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		
175 -132.9	R18-SN 10 ft 100%	NA	NA		Disaggregated Limestone 168.9-170.5' - grayish orange, (10YR 7/4), strong HCl reaction	Possible rip-up clast at 168.8'	
					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'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 10 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
180 -137.9	R19-SN 10 ft 100%	NA	NA		Limestone Fragments 176.0-181.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, strong HCl reaction, 4" in length, poorly fossiliferous, voids over 10-20% of surface Disaggregated Limestone 181.0-182.1' - yellowish gray, (5Y 7/2), moderate HCl reaction 182.1-183.6' - moderate yellowish brown, (10YR 5/4), strong HCl reaction		
185 -142.9	186.0				Limestone 183.6-186.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, discs up to 3" in length with interbedded clays 1/8" to 1" thick, highly fossiliferous with voids over 30-60% of surface Disaggregated Limestone 186.0-196.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, limestone fragments throughout 10' section, 60-80% limestone fragments from 186.0-188.8', decreases with depth to <10% from 192.0-196.0'		
190 -147.9	R20-SN 10 ft 100%	NA	NA				
195 -152.9	196.0						



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.9	R21-SN 10 ft 80%	NA	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 Limestone Fragments 203.0-204.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, fragments are gravel-sized, up to 1/2" in diameter No Recovery 204.0-206.0'		
205 -162.9			NR		Limestone Fragments 206.0-207.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, poorly fossiliferous Disaggregated Limestone 207.0-216.0' - yellowish gray, (5Y 7/2), mild to strong HCl reaction, gravel-sized fragments up to 1" in diameter, subrounded to subangular		
210 -167.9	R22-SN 10 ft 100%	NA	NA				
215 -172.9							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 12 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.9	R23-SN 10 ft 100%	NA	NA	[Symbolic Log Pattern]	Disaggregated Limestone 216.0-233.0' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, subangular to angular gravel-sized fragments up to 1" in diameter, limestone fragments up to 3" in diameter at 220.0-220.7', pale greenish yellow (10YR 8/2), fine grained, strong HCl reaction		
225 -182.9	226.0		226.0-236.0' - NA				
230 -187.9	R24-SN 10 ft 85%	NA	NA	[Symbolic Log Pattern]	Limestone Fragments 233.0-234.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, fragments are gravel-sized No Recovery 234.5-236.0'		
235 -192.9	236.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 13 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -197.9	R25-SN 10 ft 100%	NA	NA		Limestone Fragments 236.0-246.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, fine-grained limestone fragments, subrounded to subangular gravel-sized fragments up to 1" in diameter		
245 -202.9	246.0						Disaggregated Limestone 246.0-254.6' - Same as 236.0-246.0'
250 -207.9	R26-SN 10 ft 86%	NA	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
255 -212.9			NR		No Recovery 254.6-256.0'		
	256.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-03	SHEET 14 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 2.0 ft bgs on 3/21/07 START : 3/21/2007 END : 3/23/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -217.9	R27-SN 10 ft 100%	NA	NA		Limestone Fragments 256.0-266.0' - Same as 249.5-254.6'		
265 -222.9							
266.0					Bottom of Boring at 266.0 ft bgs on 3/23/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
41.6	0.0			Poorly Graded Sand (SP) 0.0-4.0' - moderate yellowish brown, (10YR 5/4), trace fine gravel, fine to medium silica sand to 1/16", trace fines, trace organics, color varies to dark yellowish orange (10YR 6/6) between 1.0-2.0' , dusky yellow (5Y 6/4) between 2.0-4.0'		
	6.0	R1-SN		Sandy Lean Clay (CL) 4.0-5.0' - pale olive, (10Y 6/2), moist, soft, low to medium plasticity, slow to rapid dilatancy, no HCl reaction, 30-35% very fine to fine silica sand		R1: 3 minutes
5 36.6	6.0			Silt (ML) 5.0-6.0' - grayish yellow, (5Y 8/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized sand, carbonate materials 6.0-7.9' - Same as 5.0-6.0'		
	10.0	R2-SN		Limestone 7.9-9.9' - dusky yellow, (5Y 6/4), medium grained, mild HCl reaction, very weak (R1), moderately cemented, 60% coverage of small voids		
10 31.6	10.0			Silt (ML) 9.9-16.0' - Same as 4.0-5.0' except small 1-2" thick sections of limestone		
	16.0			16.0-26.0' - Same as 5.0-6.0' except strong HCl reaction, limestone fragments up to 3" thick, many small fragments from gravel-size up to 3/8"		R2: 7 minutes
15 26.6						
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
21.6	10.0	R3-SN				
25 16.6	26.0			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 11.6	10.0	R4-SN				
35 6.6	36.0			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						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
1.6	10.0	R5-SN				
45 -3.4	46.0			Sandy Lean Clay (CL) 44.7-46.0' - moderate olive brown, (5Y 4/4), moist, low to moderate plasticity, strong HCl reaction, 30-40% sand-sized sand, carbonate materials Silt (ML) 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 Limestone 47.6-55.5' - Same as 36.0-46.0' except many zones where rock fragments from fine to medium sand-sized up to cobble sized fragments, possibly from drilling		R5: 8 minutes
50 -8.4	9.5	R6-SN				
55 -13.4				No Recovery 55.5-56.0' Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log		R6: 9 minutes
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 4 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
56.0	R7-SN 10 ft 55%	NA	NA	56.0-66.0' - NA	Limestone 56.0-57.4' - Same as 36.0-46.0' except silt to very fine to fine sand-sized fragments of limestone, possibly from drilling 57.4-58.7' - Same as 56.0-57.4' 59.9-60.7' - Same as 56.0-57.4' No Recovery 61.5-66.0'	Poor recovery due to core rods becoming stuck in hole. Driller asked if he could over drill with outer casing to recover bit in order to prevent future problems later that have come as a byproduct of overstressing these borings to "un-stick" steel. NA = Not Applicable NR = No Recovery R7: 43 minutes	
60 -18.4							NR
65 -23.4	R8-SN 10 ft 76%	NA	NA	66.0-76.0' - NA	Limestone 66.0-76.0' - Same as 36.0-46.0' except strong HCl reaction, medium strong to strong (R3 to R4), 90-95% coverage small voids, many cavities up to 1/4", several silt zones in section No Recovery 73.6-76.0'	Silt zones explain poor recovery R8: 21 minutes	
70 -28.4							NR
75 -33.4	R8-SN 10 ft 76%	NA	NA	66.0-76.0' - NA	Limestone 66.0-76.0' - Same as 36.0-46.0' except strong HCl reaction, medium strong to strong (R3 to R4), 90-95% coverage small voids, many cavities up to 1/4", several silt zones in section No Recovery 73.6-76.0'	Silt zones explain poor recovery R8: 21 minutes	
76.0							NR



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 5 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS		
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION	
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	
80 -38.4	R9-SN 10 ft 93%	NA	NA		Limestone 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, possibly due to drilling	The limestone matrix (olive gray limestone) has strong HCl reaction, while dark gray features have mild HCl reaction		
85 -43.4							No Recovery 85.3-86.0'	R9: 26 minutes
86.0			NR					
90 -48.4	R10-SN 10 ft 100%	NA	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 features	R10: 15 minutes		
95 -53.4								
96.0								



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 6 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -58.4	R11-SN 10 ft 50%	NA	NA		Limestone 96.0-106.0' - Same as 36.0-46.0'	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. R11: 27 minutes Logger changes to C. Sump at 106.0' until end of log Driller's Remark: maintaining drilling fluid circulation at 106.0-112.0' Weak limestone completely disaggregated by drilling method Run time: N/A, core at end of previous shift retrieved at start of this shift (3/24/07)	
105 -63.4	NA	NR	96.0-106.0' - NA		No Recovery 101.0-106.0'		
110 -68.4	106.0	NA	NA		106.0-116.0' - NA		Disaggregated Weak Limestone 106.0-116.0' - very pale orange, (10YR 8/2), strong HCl reaction, gravel-sized clasts of more indurated fine grained material, thin (<1/32") calcite fracture coating observed on one indurated fragment, fossil molds visible on few indurated fragments; 115.5-116.0' - weak (R2), roughly horizontal parting surfaces (2-3" apart), rough and undulating
115 -73.4	R12-SN 10 ft 100%	NA	NA				
	116.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 7 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -78.4	R13-SN 10 ft 85%	NA	NA		Limestone Fragments 116.0-126.5' - very pale orange, (10YR 8/2), strong HCl reaction, fragments very weak and friable, range in size from fine gravel to 3.0" lenticular disc-shaped fragments (1-2" thickness), large fragments may be indicative of thin more competent limestone beds with weaker interbeds that disintegrate during drilling	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. Material lost from 124.5-126.0' may have been fines lost over length of run R13: 17 minutes	
125 -83.4			NR				No Recovery 124.5-126.0'
130 -88.4	R14-SN 10 ft 79%	NA	NA		Disaggregated Limestone With Limestone Fragments 126.0-133.9' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), very strong HCl reaction, >15% gravel-sized limestone fragments, limestone fragments 1" or less in silty zone increasing to 2.5" in the lower half of run, silt-size particles grading with depth into sand-sized fragments	R14: 20 minutes	
135 -93.4			NR				No Recovery 133.9-136.0'



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 8 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -98.4	R15-SN 10 ft 87%	NA	NA		<p>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</p> <p>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 molds; horizontal partings range from 0.75-30" with little or no fragment infill material</p>	<p>R15: 24 minutes</p> <p>Driller's Remark: Lost circulation (driving 6" casing) at approximately 141'</p> <p>Trace very fine silica sand grains (<5%)</p>	
145 -103.4	146.0	NR		<p>Limestone 142.5-143.5' - medium yellow brown, (10YR 5/4), medium HCl reaction 143.5-144.7' - yellowish gray, (5Y 7/2), strong (R4), fine grained limestone with thin (1/64-1/32") pale yellowish brown laminations on variable spacing (1/32-1/8"), dense, partial recrystallization, moderate HCl reaction at grain boundaries and when scratched, possible very fine silica sand (<10%), 15-30" horizontal partings (bedding plane) with medium indurated light olive gray (5Y 5/2) interbeds 0.75-1.0" thick</p>			
150 -108.4	R16-SN 10 ft 75%	NA	NA		<p>No Recovery 144.7-146.0' Limestone Fragments 146.0-147.8' - very strong HCl reaction, weak (R2), partially friable by hand, fragments 1-2" diameter and <1/2" thick (lenticular), likely representing thinly bedded material</p>		
155 -113.4	156.0	NR			R16: 22 minutes		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 9 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -118.4	R17-SN 10 ft 87%	NA	NA		<p>Limestone 147.8-150.5' - pale yellowish brown, (10YR 6/2), strong HCl 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</p> <p>150.5-151.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, friable thinly bedded (<1/2") limestone fragments with sandy fines, trace silica sand grains (<5%)</p> <p>151.5-153.5' - Same as 150.5-151.5' except moderate yellowish brown, sandy silt at bottom</p> <p>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 and likely segregated during drilling</p> <p>161.6-161.8' - moderate yellow brown, (10YR 5/4), strong HCl reaction</p> <p>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 HCl reaction, argillaceous, horizontal partings, 1-6" spacing with light gray sandy silt interbeds/coating (light gray, N7)</p> <p>No Recovery 164.7-166.0' Limestone 166.0-168.5' - light olive gray, (5Y 5/2), moderate especially grain boundaries HCl 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 greater than olive gray</p>	<p>Driller's Remark: Sample 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.</p> <p>Up to 10% silica sand grains</p> <p>With up to 10% fine silica sand grains</p> <p>166.0-176.0' interval not disturbed</p>	
165 -123.4	166.0		NR				
170 -128.4	R18-SN 10 ft 89%	NA	NA				
175 -133.4	176.0		NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 1.0 ft bgs on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -158.4	R21-SN 10 ft 92%	NA	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 HCl reaction, medium 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 HCl reaction, "punk 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)	R21: 22 minutes	
205 -163.4	206.0	NR	206.0-216.0' - NA				
210 -168.4	R22-SN 10 ft 100%	NA	NA				
215 -173.4	216.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 12 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -178.4	R23-SN 10 ft 94%	NA	NA		Disaggregated Limestone With Limestone Fragments 216.0-226.0' - mild HCl reaction, grading to Silty Sand with Gravel (SP-SM) in places, similar to above (206.0-216.0') except greater silt and sand-sized particles and limestone fragments are smaller (<1") and weaker (very friable) 216.6-217.0' moderately indurated silt-sized, light gray (N7) bed, friable	R23: 24 minutes	
225 -183.4	226.0		NR		No Recovery 225.4-226.0' Disaggregated Limestone With Limestone Fragments 226.0-236.0' - Same as 216.0-226.0' except no semi indurated silt bed, slight increase in overall fine to medium sand-sized material (carbonate derived), few zones with very thin (<3/4") gravel-sized angular fragments of limestone (or indurated calcareous silt-sized material)		
230 -188.4	R24-SN 10 ft 100%	NA	NA			R24: 36 minutes	
235 -193.4	236.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 13 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -198.4	R25-SN 10 ft 100%	NA	NA		Disaggregated Limestone With 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		
245 -203.4						R25: 27 minutes	
246.0							
250 -208.4	R26-SN 10 ft 100%	NA	NA		246.0-256.0' - mild to moderate HCl 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		
255 -213.4						R26: 31 minutes	
256.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-04	SHEET 14 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 on 3/23/07 START : 3/23/2007 END : 3/24/2007 LOGGER : A. Teal, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -218.4	R27-SN 10 ft 100%	NA	NA	256.0-266.0' - NA	Disaggregated Limestone With Limestone Fragments 256.0-266.0' - Same as 246.0-256.0' except lack of distinct laminated beds of silt-sized material, silty sand-sized, with gravel-sized limestone fragments (weak, friable), all carbonate derived	No silica sand grains visible (too fine grained)	
265 -223.4						R27: 37 minutes	
266.0					Bottom of Boring at 266.0 ft bgs on 3/24/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
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				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'			Forams, gastropods, possible bryozoans
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		Interfragmental filling of fat clay, clay and clayey silt, with or without additional smaller gravel-sized fragments; the fines have moderate reaction to HCl, limited plasticity
35 7.2				Silt With Sand (ML) 34.0-36.0' - pale yellowish brown, (10YR 6/2), nonplastic, moderate HCl reaction, with very fine grained sand-size particles, all carbonate materials		
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		Silica grains (very fine) to silt-sized in very thin pseudobeds may exhibit microstructures of deformation and bedding
				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: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
2.2	10.0	R5-SN				
45 -2.8	46.0					Grayish brown clay (5YR 3/2) as stringers, tacky, soft and contains minor sand size grains
50 -7.8	10.0	R6-SN		Sandy Silt With Limestone Fragments (ML) 47.8-56.0' - pale yellowish brown, (5YR 3/2), moist, nonplastic, moderate HCl reaction, with very fine to fine sand-sized particles and 20-35% fine to coarse gravel-sized limestone fragments, percentage of limestone fragments increases with depth, all carbonate materials		Brown clay seams Clay seams Gravel-sized fragments increase in percentage to end of run
55 -12.8				Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log		
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 4 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
56.0	R7-SN 10 ft 100%	NA	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 66.0-70.0' - moderate olive brown, (5Y 4/4), fine grained, strong HCl 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 HCl 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	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 SC-1 collected at 69.3-70.0' Possible organics in 1/4" or less stringers	
60 -17.8							65 -22.8	70 -27.8	75 -32.8
66.0	R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA			
76.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 5 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -37.8	R9-SN 10 ft 90%	NA	NA		<p>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</p> <p>Limestone 79.5-85.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong to strong (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</p>	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			NR		No Recovery 85.0-86.0'		
90 -47.8	R10-SN 10 ft 90%	NA	NA		<p>Limestone 86.0-87.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, pulverized to sand-sized particles</p> <p>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'</p> <p>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</p> <p>Disaggregated Limestone 89.8-92.5' - yellowish gray, thinly bedded (<3/8") down to varve-like planes</p> <p>Limestone 92.5-93.4' - very pale orange, (10YR 8/2), micritic, sparse flecks of organic material</p>	Limestone contains numerous voids (65-70%) of fossil casts and molds, thin (<1/8") organic stringers less than 1/2" long	
95 -52.8			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 6 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -57.8	R11-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone With Limestone Fragments 93.4-95.0' - very pale orange fines, (10YR 5/2), strong HCl reaction, grayish orange pink (5YR 7/2) limestone fragments from 3/16" to >2", fragments are fossiliferous with casts and molds, <5% shell fragments, <10% organic material, fragments react moderately to HCl</p> <p>No Recovery 95.0-96.0'</p> <p>Disaggregated Limestone With Limestone Fragments 96.0-115.5' - very pale orange, (10YR 8/2), moderate to strong HCl reaction, grades from a tacky, pasty, carbonate derived silt/clay with 10-15% sand-sized particles becoming 35-45% gravel-sized fragments at 102.3', fragments are fossiliferous limestone (bi-valves, forams and bryozoans) with 50% void space, no organic material</p>	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
105 -62.8	106.0						
110 -67.8	R12-SN 10 ft 95%	NA	NA		<p>Very friable light brown (5YR 6/4) limestone fragments of carbonate derived sand and silt at 110.5', fragments from 2"x2-1/2" to pea gravel size with numerous fossil casts and visible shell fragments, most of the rock is sand and silt-sized grains, void space is minimal at 25-30%, moderate HCl reaction</p>	Loose carbonate grains are the same as the constituents of the limestone fragments, suggesting that the drilling method disaggregates the limestone	
115 -72.8	116.0		NR		No Recovery 115.5-116.0'		



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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -77.8	R13-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone With Limestone Fragments 116.0-118.3' - very fine grained, 6" of light brown sandy silt-sized particles with gravel-sized particles atop 0.8' of limestone fragments, pale yellowish brown (micritic) limestone clasts with 15% void space and poorly fossiliferous</p> <p>Disaggregated Limestone 118.3-123.1' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), strong HCl reaction, strong reaction to HCl in all carbonate derived particles, gravel-sized fragments at 120.5-121.0'</p>	Delayed mild to moderate reaction to HCl on actual limestone, finer grained clast fillings react strongly to HCl This is carbonate silt-sized material	
125 -82.8	126.0				<p>Disaggregated Limestone With Limestone Fragments 123.1-125.2' - very pale orange, (10YR 8/2), strong HCl reaction, limestone fragments up to 1" in size</p> <p>125.2-126.0' - very pale orange, (10YR 8/2), 15% fragments (up to 3/4") of very fine grained limestone</p>	The sequence at 126.0-136.0' looks very similar to the immediately preceding fining upward materials	
130 -87.8	R14-SN 10 ft 100%	NA	NA		<p>126.0-128.1' - very pale orange, (10YR 8/2), moderate HCl reaction, sand and silt-sized carbonate grains, limestone fragments are composed of sand and silt-sized grains and 3-5% black spots (1/16") that appear organic</p> <p>Disaggregated Interbedded Weak Limestone 128.1-135.6' - grayish orange pink, (5YR 7/2), moderate to strong HCl reaction, friable to micritic thin (<1/2") limestone beds; beds are undulant and generally discontinuous across the width of the core</p>	The major part of these runs were sliced in half by the spatula and moved with a mortar trowel; the gravelly parts tend to be in more pieces	
135 -92.8	136.0						



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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -97.8	R15-SN 10 ft 90%	NA	NA		Limestone Fragments 135.6-137.5' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl 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 HCl 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 HCl reaction, fragments up to 4" long, many partings with not much infilling, some iron oxides noted, particularly 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'	Large fossil (possible gastropod) in pale yellowish brown (10YR 6/2) limestone This unit appears to be weak rock; limestone destroyed during sonic drilling Limestone fragments appear broken due to drilling methods	
145 -102.8	146.0	NR	146.0-156.0' - 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		
150 -107.8	R16-SN 10 ft 100%	NA	NA		Limestone 151.0-151.3' - light brown, (5YR 6/4), fossiliferous (casts), fragments up to 1" in size 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		
155 -112.8	156.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 9 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -117.8	R17-SN 10 ft 100%	NA	NA		<p>Arenaceous Limestone 156.5-161.0' - pale brown, (5YR 5/2), very fine grained, medium strong (R3), fossiliferous, fragmented with the largest fragment being 0.4' long, 60% void spaces (casts of dissolved biota), sparse 1/16"-3/16" voids, thin to laminar bedding with beds as thin as 1/8", possible pyrite blebs</p> <p>Limestone 161.0-162.3' - light brown, (5YR 6/4), very fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts)</p> <p>Limestone To Arenaceous Limestone 162.3-163.8' - light brown, (5YR 6/4), mild HCl reaction, very thinly to thinly bedded, limestone contains silica grains</p> <p>Disaggregated Weak Limestone 163.8-165.2' - light olive gray, (5Y 5/2), carbonate derived silt-sized particles along bedding planes <1/8" to 3/8" thick, beds contain <10% silica sand</p> <p>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')</p> <p>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</p> <p>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</p> <p>No Recovery 175.0-176.0'</p>	<p>159.0-161.0' may have been broken apart by the drilling method</p> <p>This material is highly broken</p> <p>The drilling method may have created the partings and vibrated the fines between individual pieces of rock</p> <p>No euhedral or subhedral crystals visible SC-2 collected at 171.6-172.3'</p>	
165 -122.8	166.0				156.0-166.0' - NA		
170 -127.8	R18-SN 10 ft 90%	NA	NA		166.0-176.0' - NA		
175 -132.8	176.0		NR				



PROJECT NUMBER: 338884.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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
180 -137.8	R19-SN 10 ft 90%	NA	NA		Limestone 176.0-183.2' - grayish orange to pale brown, (10YR 7/4 to 5YR 5/2), very fine grained, mild to moderate HCl reaction, arenaceous, thinly interbedded with carbonate intergranular filling, HCl reaction is mainly in void filling and fossil cast lining, poorly fossiliferous, overt porosity is <35%, limestone contact is irregular and gradational in a very thin zone (<1/16")	Partings or interbed surfaces exhibit organic or iron oxide (Gothite) patinas or stains 179.0-179.6' - Appears as a breccia, gray clast in pale brown limestone matrix 181.0-182.1' - Thinly bedded limestone 182.1-183.2' - Thin broken beds, drilling related 183.2-185.0' - Unit may have been broken by drilling method, particularly in "harder" beds	
185 -142.8	186.0		NR		Disaggregated Weak Limestone 183.2-185.0' - grayish orange, (10YR 7/4), very fine grained, strong HCl reaction, carbonate derived silt-sized and very fine sand-sized grains in irregular thin beds with organic material defining some of the planar features, silica <5% and sparse No Recovery 185.0-186.0' Disaggregated Limestone With Limestone Fragments 186.0-194.1' - grayish orange, (10YR 7/4), mild to moderate HCl reaction, up to 40% gravel-sized limestone fragments, broken and granulated, fragments range from <1/4" to 1-1/2"x2"x1", independent clasts exhibit bedding plane discontinuities and settling features, limestone moderately fossiliferous (casts)	This appears to be partially to be a very weak agglomeration of silt, sand and rock (gravel-sized fragments) that may represent a collapse feature	
190 -147.8	R20-SN 10 ft 100%	NA	NA		186.0-196.0' - NA		
195 -152.8	196.0						



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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.8	R21-SN 10 ft 100%	NA	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)	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	
205 -162.8					Disaggregated Interbedded Limestone 204.7-206.0' - very pale orange, (10YR 8/2), moderate to strong HCl 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'	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	
210 -167.8	R22-SN 10 ft 100%	NA	NA				
215 -172.8					Disaggregated Interbedded Limestone With Limestone Fragments 213.5-216.0' - Same as 206.0-210.5'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 12 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.8	R23-SN 10 ft 95%	NA	NA	[Symbolic Log]	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	
225 -182.8	226.0	NR	No Recovery 225.5-226.0' Disaggregated Fossiliferous Limestone 226.0-236.0' - Same as 216.0-225.5'				
230 -187.8	R24-SN 10 ft 100%	NA	NA	[Symbolic Log]			
235 -192.8	236.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 13 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -197.8	R25-SN 10 ft 100%	NA	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 HCl reaction	
245 -202.8	246.0					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	
250 -207.8	R26-SN 10 ft 85%	NA	NA		246.0-254.5' - very pale orange, (10YR 8/2), strong HCl 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 HCl, the rock character change is obvious	The final 20-30' of drilling was quite difficult, and many runs in and out were required to drill the hole and maintain the borehole; some of the rock appears completely broken due to the drilling technique	
255 -212.8	256.0		NR		No Recovery 254.5-256.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-05	SHEET 14 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -217.8	R27-SN 10 ft 100%	NA	NA		Disaggregated Limestone With Limestone Fragments 256.0-259.7' - light brown, (5YR 6/4), fine to medium grained, moderate to strong HCl 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 HCl reaction, limestone fragments average less than 1" in size		
265 -222.8	266.0		NA		Disaggregated Limestone 265.0-266.0' - moderate orange pink, (5YR 8/4), contains no limestone fragments 266.0-267.5' - 1.5' recovered No Recovery 267.5-271.0'	Drilled to 266.0', driller dropped casing twice and had to retrieve; retrieval process resulted in extending the boring's total depth to 271.0' in order to recover casing and core	
270 -227.8	5 ft 30%	NA	NR		Bottom of Boring at 271.0 ft bgs on 2/12/2007	Total depth of boring is 271.0'	



PROJECT NUMBER: 338884.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
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.3	0.0			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 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'		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)" Water levels were not recorded for I-06 Coring run times were not recorded for I-06
5 37.3	6.0	4.5	R1-SN	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' 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 HCl
10 32.3		10.0	R2-SN	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		
15 27.3	16.0					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
22.3	10.0	R3-SN				
25 17.3	26.0			26.0-30.3' - Same as 16.0-26.0' except no very fine sand, no fine gravel-sized limestone fragments		
30 12.3				Begin Rock Coring at 30.0 ft bgs See the next sheet for the rock core log		
35 7.3						
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 3 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
12.3	30.0						
	R4-SN 6 ft 100%	NA	NA		Limestone 30.3-36.0' - grayish orange and medium gray, (10YR 7/4 and N5), moderate to strong HCl reaction, medium strong (R3), thin to medium bedding, horizontal partings 3/4"-4", numerous small (1/32"-1/8") voids, few (<3/4") cavities, fossiliferous with significantly more molds than casts, thin horizontal zones (possibly beds) of fine grained limestone with no voids; 1/2"-4" thick (1"-3" average) silt/clay interbeds with gravel-sized limestone fragments, light gray (N6) grading to medium dark gray (N4) with depth, sharp contacts	NA = Not Applicable NR = No Recovery	
35 7.3							
					Sandy Silt With Limestone Fragments (ML) 36.0-46.0' - moderate yellowish brown, (10YR 5/4), nonplastic to low plasticity, moderate HCl reaction, fine gravel-sized fragments (<10%) <1/2" diameter, <10% very fine to fine sand-sized, dark brown organic material at 42.0'		
40 2.3	R5-SN 10 ft 100%	NA	NA				
45 -2.8							
					46.0-52.5' - Same as 36.0-46.0' except coarse grained sand-sized limestone fragments, dark brown organic mottling, 10% to >50% sand content, <10% fine gravel-sized limestone fragments		
50							



PROJECT NUMBER: 338884.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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-7.8	R6-SN 10 ft 100%	NA	NA				
55 -12.8					<p>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</p> <p>Sandy Lean Clay With Limestone Fragments (CL) 52.8-56.0' - 15-25% subangular to 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</p>		
60 -17.8	R7-SN 10 ft 100%	NA	NA		<p>Interbedded Limestone And Clay 61.0-63.4' - light medium gray (clay), (N6), moderate to strong HCl reaction, few fossils or surface voids or cavities, dark brown/black laminated inclusions, thin partings every 1"-3"</p> <p>Disaggregated Limestone 63.4-66.0' - moderate yellowish brown, moderate to strong HCl reaction, mostly very fine sand-sized limestone fragments, with gravel-sized limestone fragments similar to 61.0-63.4'</p>		
65 -22.8					<p>Limestone 66.0-66.9' - Same as 61.0-63.4' except thin bedding and clayey silt interbeds</p> <p>Limestone Fragments 66.9-68.7' - fine gravel-sized (4"-6") particles, sandy silt, carbonate derived</p>	Repeating sequences of 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')	
70						Driller's Remark: Difficulty advancing 6" casing	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 5 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-27.8	R8-SN 10 ft 100%	NA	NA		Interbedded Limestone 68.7-73.5' - thin bedding, similar to 66.9-68.7' except increasing interbed thickness with depth (<1"-6"), limestone partings		
75 -32.8					Disaggregated Limestone 73.5-76.0' - moderate HCl reaction, 10-20% gravel-sized (1/2"-1") limestone fragments, carbonate derived material		
76.0					76.0-86.0' - NA	Driller's Remark: Extremely difficult advancing 6" casing, lost drilling fluid circulation	
80 -37.8	R9-SN 10 ft 100%	NA	NA				
85 -42.8					Limestone Fragments 83.0-86.0' - yellowish gray, coarse sand to coarse gravel-sized fragments (1/4" to >3")		
86.0					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 with thin (1/4"-1/2") dark brown to black organic layers	Driller's Remark: Difficult advancing 6" casing; no drilling mud circulation	
90					86.0-96.0' - NA		



PROJECT NUMBER: 338884.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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-47.8	R10-SN 10 ft 100%	NA	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")		
95 -52.8					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		
100 -57.8	R11-SN 10 ft 100%	NA	NA		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 between, the percentage of larger fragments increases at end of run (>50%)		
105 -62.8					106.0-116.0' - NA		
110						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: 338884.FL	BORING NUMBER: I-06	SHEET 7 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-67.8	R12-SN 10 ft 100%	NA	NA		Limestone Fragments With 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 fossils 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 material	Driller's Remark: Difficulty advancing 6" casing	
115 -72.8	116.0			116.0-126.0' - NA			
120 -77.8	R13-SN 10 ft 100%	NA	NA		Interbedded Limestone And Clayey 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") <5%, single full core diameter piece		
125 -82.8	126.0			126.0-136.0' - NA			
130							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 8 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-87.8	R14-SN 10 ft 100%	NA	NA		Limestone 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		
135 -92.8					134.9-136.0' - limestone fragments with sandy silt to gravel-sized fragments, angular to subangular, 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 sections up to 0.3' in length	Driller's Remark: Advancing 6" casing becoming easier (better rock)	
140 -97.8	R15-SN 10 ft 86%	NA	NA		Disaggregated Limestone 143.4-144.6' - mild to moderate HCl reaction, 10-20% silica grains No Recovery 144.6-146.0'		
145 -102.8			NR		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 1/2"-3/4" thick		
150							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 9 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-107.8	R16-SN 10 ft 100%	NA	NA		<p>Limestone 151.0-151.8' - medium strong to strong (R3 to R4), fossiliferous (molds & casts), voids (1/32"-1/8") < 5%</p> <p>Limestone Fragments 151.8-153.9' - Same as 151.0-151.8' except 1" thick</p> <p>Disaggregated Limestone 153.9-155.0' - with gravel-sized limestone fragments, some dark brown mottling, possible organics</p> <p>Limestone 155.0-155.4' - Same as 151.0-151.8'</p> <p>Disaggregated Limestone 155.4-156.0' - Same as 153.9-155.0'</p> <p>Limestone Fragments 156.0-166.0' - moderate yellowish brown to medium light gray, (10YR 5/4 to N6), strong (R4), with thin yellowish gray/dark brown sandy silt layer (1-1/2"-2" thick) at 158.0' and 159.0', few full core diameter limestone fragments 2"-3" thick at 161.0-163.0' with smaller fragments in between, disaggregated limestone increasing with depth at 164.5-166.0', fragments are medium strong to strong (R3 to R4), with trace small voids (1/32"-1/8") and cavities (<3/4" diameter) at 161.4-162.6' and 165.5-166.0', fragments are generally thin, partial disc shaped fragments that appear to be breaking on bedding plane surfaces, full core diameter limestone fragments at 158.6-159.0'</p>		
155 -112.8					156.0-166.0' - NA		
160 -117.8	R17-SN 10 ft 100%	NA	NA				
165 -122.8					166.0-176.0' - NA		
170						Driller's Remark: Segregated by drilling	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 10 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-127.8	R18-SN 10 ft 100%	NA	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		
175 -132.8							
176.0					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 HCl reaction when scratched 176.2-183.4' - limestone fragments are fine grained and angular to subangular, increasing disaggregation with depth		
180 -137.8	R19-SN 10 ft 100%	NA	NA				
185 -142.8					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	
186.0					186.0-196.0' - NA		
190							



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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-147.8	R20-SN 10 ft 100%	NA	NA		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'		
195 -152.8							
196.0					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'		
200 -157.8	R21-SN 10 ft 100%	NA	NA				
205 -162.8							
206.0							
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)		
210							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 12 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-167.8	R22-SN 10 ft 85%	NA	NA		Limestone Fragments 207.5-214.5' - silty to sandy gravel-sized limestone fragments, fragments vary from to 50 to >90% of core and range in size from 1/2" to >3" diameter, medium brown silt layer at 213.5' (organics)		
215 -172.8			NR		No Recovery 214.5-216.0'		
216.0					Limestone 216.0-225.0' - similar to 207.5-216.0', repeating sequence of (2"-4") angular limestone fragments and few full core diameter disc shaped fragments with sandy to silt with gravel-sized limestone fragment layers (1.0-2.0' thick)		
220 -177.8	R23-SN 10 ft 90%	NA	NA		Limestone Fragments 217.2-217.6' - light olive gray, highly fossiliferous limestone fragments, large molds and casts (>1/2") (brachiopods), dark gray/black pyritic surface staining on parting surfaces and often restricted to fossil molds 217.6-219.3' - highly fragmented limestone, few fossils/voids		
225 -182.8			NR		Limestone Breccia 219.3-219.6' - light yellowish gray, medium strong (R3), with olive gray angular clasts, pyrite on fracture surfaces Disaggregated Limestone 220.0-222.4' - with gravel-sized limestone fragments (<1")		
226.0					Limestone 222.4-222.8' - 1" thick limestone beds Disaggregated Limestone 222.8-225.0' - with gravel-sized limestone fragments (1/4" to >1" diameter), large (>3") fragments, olive gray highly fossiliferous limestone at end of run (225.0')		
230					No Recovery 225.0-226.0' Limestone 226.0-227.0' - solution cavities (1/4"-1/2" diameter up to 1" length/depth) and/or burrows, very fossiliferous, with molds (brachiopods) exhibiting horizontal alignment (bedding plane orientation)		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 13 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-187.8	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'		
235 -192.8							
					236.0-246.0' - NA		
240 -197.8	R25-SN 10 ft 100%	NA	NA		244.2-245.4' - few larger (>1") limestone fragments, moderate HCl reaction		
245 -202.8					246.0-256.0' - NA	Driller's Remark: 6" casing advanced very easily	
250							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-06	SHEET 14 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/7/2007 END : 3/10/2007 LOGGER : C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-207.8	R26-SN 10 ft 85%	NA	NA		246.0-254.5' - Same as 236.0-246.0' except except single full size diameter limestone fragment at 252.0', cone shaped with very thin dark brown horizontal laminations (< 1/32"), 1/6" total thickness, 1" diameter limestone fragment immediately above has dark gray/black pyritic coating on two fracture faces; medium yellowish brown sandy silt with fine gravel-sized fragments (<10%, 1/4"-1/2" diameter) at 253.4-253.5'	Driller's Remark: Drilling 6" casing advanced very easily	
255 -212.8			NR		No Recovery 254.5-256.0'		
256.0					Limestone 256.0-265.2' - disaggregated, with limestone fragments, same as 253.4-253.5', fragments 1"-3" diameter		
260 -217.8	R27-SN 10 ft 92%	NA	NA				
265 -222.8					No Recovery 265.2-266.0'		
266.0					Bottom of Boring at 266.0 ft bgs on 3/10/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 ELEVATION : 42.4 ft (NAVD88) DRILLING CONTRACTOR : Prosonic, Ocala, FL; Driller: N. Gamache
 DRILLING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
42.4	0.0			Topsoil 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		Note: Retrieved core appears compressed (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	5.0	R1-SN		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) 7.0-8.3' - no HCl reaction, fine silica sand, may be slough material 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		Retrieved core greater than 10.0 ft; 1.3 ft silica sand may be slough from run R1-SN 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
10 32.4	10.0	R2-SN				
15 27.4				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		
17.0						
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
22.4						
	10.0	R3-SN				
25 17.4						
	27.0					
30 12.4				Silty Sand With Limestone Fragments (SM) 27.0-29.5' - grayish orange, (10YR 7/4), fine grained, with gravel-sized (1/4"-3/4") limestone fragments (similar to fragments described for 19.0-22.0' above), gravel fragments are <15% of sample, clayey zone at 29.0' with dark brown silt layer (possible organics), all carbonate materials Limestone 29.5-36.6' - pale yellowish brown, (10YR 6/2), core is fragmented, with one piece 8" in length, fossiliferous (casts/molds), small (1/16"-1/8") surface voids over 10-15% of surface, horizontal partings roughly 1"-2-1/2" apart, yellowish gray (5YR 7/2) clayey silt interbeds between partings, interbeds average <1" and are compacted, between 34.0-35.0' and 36.0-36.7' there are some 12" thick clay/silt interbeds with 10% coarse sand and fine gravel-sized particles		Core "hot" immediately following drilling, likely drying thin layers
35 7.4	9.6	R4-SN				
						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: 338884.FL	BORING NUMBER: I-07	SHEET 3 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
37.0	R5-SN 10 ft 100%	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	
40 2.4							
45 -2.6	R6-SN 10 ft 92%	NA	NA	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)		
47.0							
50 -7.6					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	
55 -12.6							
57.0			NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 4 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
60 -17.6	R7-SN 10 ft 95%	NA	NA		<p>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</p>		
65 -22.6					<p>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 fragments 1/4"-2" in diameter, dark 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)</p>		
67.0			NR				
70 -27.6	R8-SN 10 ft 96%	NA	NA				
75 -32.6							
77.0			NR		No Recovery 76.6-77.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 5 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -37.6	R9-SN 10 ft 100%	NA	NA		Limestone Fragments 77.0-83.3' - Same as 67.0-76.6' except gravel-sized limestone fragments with depth (locally up to 4")	Lost circulation between 77.0-87.0'	
85 -42.6					83.3-85.6' - 4"-5" limestone fragments, light gray clayey silt with 15% small (1/4"-3/4") limestone fragments		
87.0					Limestone 85.6-87.0' - yellowish gray, (5Y7/2), dense, fine grained, fossiliferous (casts/molds), small voids (1/16"-1/8"), 10-15% small cavities (1/2"), 8"-9" core fragment, light gray clayey interbed		
90 -47.6	R10-SN 10 ft 100%	NA	NA		Disaggregated Limestone 87.0-92.5' - carbonate derived very fine sand, dark brown/black organic layers (1"-2" thick), limestone fragments, subangular with few subrounded, 75% of limestone fragments are <1" in diameter with large (2"-4") fragments from 91.5-92.5'		
95 -52.6					Limestone 92.5-97.0' - moderate yellowish brown, (10YR5/4), fine grained, moderately strong to strong (to R4), fossiliferous limestone, with variable percentages small surface voids (1/16"-1/8"), small circular solution cavities (<1/2"), clayey silt and limestone interbeds 94.0-94.5' and 94.6-95.0'		
97.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 6 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -57.6	R11-SN 10 ft 96%	NA	NA	<p>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</p> <p>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</p>	<p>SC-1 collected at 99.2-100.0'</p>		
105 -62.6			<p>104.1-106.6' - large (2"-4") and fine gravel-sized limestone fragments (1/4"-3/4" in diameter), silty and sandy matrix (disaggregated limestone), very weak (R1) at 105.0-106.0'</p> <p>No Recovery 106.6-107.0'</p>				
110 -67.6	R12-SN 10 ft 100%	NA	NA	<p>Disaggregated Limestone 107.0-108.0' - with limestone fragments 1/4"-3/4" in diameter</p> <p>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</p>	<p>"Sandy" material at top of run may be the result of segregation during drilling</p> <p>Possible drill induced breakage</p>		
115 -72.6				<p>Limestone Fragments 110.9-113.1' - Same as 108.0-110.9' except larger fragments (3"-4"), with irregular subangular shape</p> <p>Limestone 113.1-113.9' - Same as 108.0-110.9' except less fragmented</p> <p>Limestone Fragments 113.9-114.4' - very friable</p> <p>Limestone 114.4-117.0' - Same as 113.9-114.4' except less fragmented</p>	<p>SC-2 collected at 113.1-113.9'</p> <p>SC-3 collected at 115.8-116.6'</p>		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 7 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -77.6	R13-SN 10 ft 100%	NA	NA		Disaggregated Limestone With Limestone Fragments 117.0-127.0' - NA 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 clayey silt matrix	Possible drill induced breakage	
125 -82.6					127.0		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, (10YR 5/4), moderate HCl reaction, carbonate derived Limestone 128.0-137.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl 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 133.0-134.0'
130 -87.6	R14-SN 10 ft 100%	NA	NA				
135 -92.6					137.0		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 8 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 : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -97.6	R15-SN 10 ft 85%	NA	NA		Limestone Fragments 137.0-137.9' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, fragments are well graded gravel-size, carbonate derived Limestone 137.9-138.6' - pale yellowish brown, (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 145.0-147.0'	
145 -102.6			NR				
147.0					Disaggregated Limestone 147.0-147.4' - pale yellowish brown, (10YR 6/2), strong HCl reaction Limestone 147.4-152.9' - pale yellowish brown, (10YR 6/2), medium grained, moderate to strong HCl 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 HCl 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'	
150 -107.6	R16-SN 10 ft 100%	NA	NA				
155 -112.6							
157.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 9 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -117.6	R17-SN 10 ft 90%	NA	NA		Disaggregated Limestone With Limestone Fragments 157.0-157.8' - pale yellowish brown, (10YR 6/2), sand-sized disaggregated limestone material, with gravel-sized limestone fragments Limestone 157.8-158.3' - yellowish gray, (6Y 7/2), fine to medium grained, strong HCl reaction 158.3-160.9' - light olive gray, (5YR 5/2), fine to medium grained, strong HCl reaction, delayed HCl reaction, fragmented 160.9-164.6' - light olive gray, (5Y 5/2), fine to medium grained, strong HCl reaction, partially broken into disc-shaped fragments, numerous small solution cavities 164.6-166.0' - Same as 160.9-164.6' except more fragmented, with silt at bottom of section No Recovery 166.0-167.0'		
165 -122.6							NR
170 -127.6	R18-SN 10 ft 85%	NA	NA		Disaggregated Limestone With Limestone Fragments 167.0-167.3' - pale yellowish brown, (10YR 6/2), fragments are gravel-sized Limestone 167.3-175.5' - yellowish gray, (5Y 7/2), medium grained, partially broken into disc-shaped fragments, voids (<1/16") over 10-25% of surface, with some small solution cavities (<5), HCL reaction is delayed No Recovery 175.5-177.0'	Possible drill induced breakage 167.3-171.0'	
175 -132.6							NR
177.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 10 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
180 -137.6	R19-SN 10 ft 100%	NA	NA		Limestone Fragments 177.0-187.0' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, fragmented, voids (1/16") over 75% of surface, fossiliferous		
185 -142.6					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		
187.0	R20-SN 10 ft 94%	NA	NA		Limestone 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		
190 -147.6					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		
195 -152.6							
197.0			NR		No Recovery 196.4-197.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 11 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.6	R21-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone 197.0-198.2' - coarse grained, carbonate derived, few (<10%) gravel-sized limestone fragments</p> <p>Limestone 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</p>	<p>Possible drill induced segregation of core materials</p> <p>Run drilled 2/28/07</p> <p>Infill material may have been lost during drilling 198.2-200.0' (parting/fracture surfaces do not match)</p> <p>Possible drill induced breakage</p>	
205 -162.6					<p>Limestone Fragments 203.0-207.0' - yellowish gray, with light olive gray to medium gray inclusions, (5Y 7/2 with 5Y 5/2 to N5), medium to coarse grained, moderate to strong HCl reaction, fragmented, void rich, fossiliferous, inclusions (1/2"-4") that are very hard/dense with mild HCl reaction even when pulverized (may be breccia fragments)</p>		
210 -167.6	R22-SN 10 ft 84%	NA	NA		<p>207.0-208.0' - yellowish gray, (5Y 7/2), fine grained, fragmented into 1"-4" diameter angular to subangular fragments</p> <p>208.0-215.4' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, medium strong (R3), fragmented (3/4"-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'</p>	<p>Possible drill induced breakage</p>	
215 -172.6			NR		No Recovery 215.4-217.0'		
217.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 12 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.6	R23-SN 10 ft 100%	NA	NA		Limestone Fragments 217.0-227.0' - 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)		
225 -182.6						Possible limestone breccia zones	
227.0							
230 -187.6	R24-SN 10 ft 100%	NA	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	
235 -192.6							
237.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 13 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -197.6	R25-SN 10 ft 100%	NA	NA	<p>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</p>	Possible drill induced "disaggregation"		
245 -202.6							
247.0				<p>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'</p>	Repeating upward fining sequences.		
250 -207.6	R26-SN 10 ft 100%	NA	NA				
255 -212.6							
257.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 14 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -217.6	R27-SN 10 ft 100%	NA	NA		Limestone Fragments 257.0-267.0' - Same as 247.0-257.0' except consisting of sand to gravel-size (1") limestone fragments, with fragments decreasing and becoming more friable with depth, few large fragments of more competent fine grained limestone, silt zone is absent		
265 -222.6							
267.0							
270 -227.6	R28-SN 10 ft 100%	NA	NA		267.0-277.0' - Same as 257.0-267.0' except with gravel-sized fragments (1/4"-1-1/2") and sand-sized fragments of varying percentages, few large (>3") limestone fragments at 267.0' and 269.5' that exhibit fine bedding laminations (1/8"-1/2") and bedding plane partings, medium brown silty zone at 275.0'	Material appears drier than similar zone at boring I-02--drilling with mud Repeating upward fining sequences (3-4' thick)	
275 -232.6							
277.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
280 -237.6	R29-SN 10 ft 64%	NA	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		NA	NR		No Recovery 283.4-287.0'		
287.0							
290 -247.6	R30-SN 10 ft 95%	NA	NR		Disaggregated Limestone 287.0-290.0' - with gravel-size (1/4"-3/4") limestone fragments (10-15%), fragments are angular to subangular in shape, sand-sized material has strong HCl reaction, silty material has mild to moderate HCl reaction 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 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	Core from 287-291.5' recovered during 1st 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' with difficulty, 4" core barrel retrieved and 6" casing advanced to 297 (causing slough to accumulate in hole)	
295 -252.6			NA				
297.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-07	SHEET 16 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 : 4.41 bgs on 3/6/07 START : 2/27/2007 END : 3/7/2007 LOGGER : C. Sump, J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
300 -257.6	R31-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone With Limestone Fragments 297.0-297.8' - Same as 292.0-297.0' except limestone fragments are up to 3/4" diameter and make up 10% of sample</p> <p>Disaggregated Limestone 297.8-298.8' - light gray, (N6), compacted, with friable clasts 1/16"-3/16" in length, fine bedding structure visible with lighter clasts oriented along bedding / lamination planes, distinctive downward curving laminations may represent subsidence feature</p> <p>Clayey Silt (ML) 298.8-299.0' - dark brown and black, no HCl reaction, finely laminated, vitreous sheen on laminae surfaces, organics</p> <p>Disaggregated Limestone With Limestone Fragments 299.0-306.0' - mottled yellowish gray, light olive gray, and light gray, (5Y 7/2, 5Y 5/2, and N6), strong HCl reaction, compacted, with gravel-sized limestone fragments (<10%)</p> <p>306.0-307.0' - Same as 299.0-306.0' except clear subhedral quartz (silica) crystals (<1/16"-1/4") in discrete irregular zones (possible void infilling)</p> <p>Bottom of Boring at 307.0 ft bgs on 3/7/2007</p>	<p>20 ft long 4" core barrel used to core to 307.0'; bottom 10ft is representative of 297.0-307.0'; about 6 ft of additional material recovered represents a disturbed sample from 292-297' plus slough material from advancing the 6" casing from 292.0-297.0'</p> <p>Core material at 292.0-297.0' is from 2nd attempt and is disturbed</p> <p>Similar quartz crystals observed at depth >300.0' in boring I-02 Total depth of boring is 307.0'</p>	
305 -262.6							
307.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 ELEVATION : 42.5 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
 WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
42.5	0.0			Road Base Limestone 0.0-1.0' - very pale orange, (10YR 8/2), dry, fragments (<3" diameter) imported fill Silty 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% fines 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 See the next sheet for the rock core log		Water Level: 3/13/07 approximately 3.5' below ground surface based on moisture content increase R1: 1 minute
5 37.5	6.0	R1-SN				
10 32.5						
15 27.5						
20						



PROJECT NUMBER: 338884.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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
15 27.5	R2-SN 10 ft 100%	NA	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 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) 21.6-24.4' - Same as 11.3-16.0' 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)	NA = Not Applicable NR = No Recovery R2: 9 minutes, 6' slough at top of core (discarded) Note: Installed 30' of 8" casing during run	
20 22.5	R3-SN 10 ft 100%	NA	NA	|	Sandy Silt (ML) 26.0-31.8' - grayish orange, (10YR 7/4), very fine to fine grained, nonplastic, carbonate (similar to 24.4-26.0')	R3: 26 minutes	
25 17.5				|			
30 12.5	R4-SN			|			



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 3 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
35 7.5	10 ft 100%	NA	NA		<p>Silt With Sand (ML) 31.8-32.3' - pale yellowish brown, mottled dusky yellowish brown, (10YR 6/2, 10YR 4/2), fine to medium grained, nonplastic, rapid dilatancy, dusky yellowish brown material has no HCl reactivity; pale yellowish brown material is calcium carbonate, dusky yellowish brown is organics and moderate HCl reaction</p> <p>Silty Sand And Limestone Fragments (SM) 32.3-32.5' - Same as 24.4-26.0' 32.5-36.0' - Same as 24.4-26.0' except light gray, (N7), moist, strong HCl reaction, friable fragments up to 4" in diameter comprised of very fine to fine sand-sized particles, carbonate materials</p> <p>Limestone Fragments 36.0-46.0' - pale yellowish brown, (10YR 6/2), moist, very fine to fine grained, strong HCl reaction, very weak (R1), very friable; 36.0-36.8' fragments up to 3-1/2" in diameter and 2" in length of medium strong (R3) rock, voids up to 3/16" covering approximately 20% of the surface, no fossils; 36.8-37.2': fracture zone same as 36.0-36.8' except maximum 2" diameter; 37.2-37.5': fragment zone same as 36.8-37.2' except gravel fragments up to 1/2"; 41.1-42.0': black (N1) mottling, organics</p> <p>Disaggregated Weak Limestone With Limestone Fragments 46.0-56.0' - grayish orange, (10YR 7/4), <10% gravel (<1-1/2"), dark brown/black mottling and thin layer at irregular intervals (organics), moderate reaction to HCl (slow to start, especially given fine grain size), gravel-sized limestone fragments of weak (R2) and friable material, carbonate derived with possible trace silica fine sand-sized grains</p>	<p>R4: 11 minutes</p> <p>Driller's Remark: Broke threads on 6" casing during run 41.1-42.0' Possible carbonized organics</p> <p>R5: 11 minutes End drilling 3/13/07 Resume drilling on 3/14/07</p>	
40 2.5	R5-SN 10 ft 100%	NA	NA			36.0-46.0' - NA	
45 -2.5	46.0					46.0-56.0' - NA	
50 -7.5	R6-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 4 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
55 -12.5	10 ft 100%	NA	NA			Higher percentage of sand-sized particles at top of run, possible segregation during drilling or slough material	
60 -17.5	R7-SN 10 ft 100%	NA	NA		Disaggregated Limestone With Limestone Fragments 56.0-66.0' - similar to 46.0-56.0' (carbonate derived) from 56.0-61.0', thin limestone beds (1" thick) with light gray clayey silt interbeds (1/2"-1" thick) from 61.0-62.0', from 62.0-66.0 grayish orange (10YR 7/4) sandy-silt with gravel-sized limestone fragments as described above from 56.0-61.0', fragments angular to subangular and most (90%) are <3/4" diameter	R6: 11 minutes Driller's Remark: Slightly more difficulty advancing 6" casing	
65 -22.5						R7: 15 minutes	
70 -27.5	R8-SN				Limestone 66.0-69.5' - thinly bedded (3/4"-2") with silty sand material on parting surfaces, highly fossiliferous (mold, casts, brachiopods), numerous small voids (1/32"-1/8") over 40-50% surface area, few voids/molds filled with black platy soft material (possible organics) 69.5-71.0' - thin beds with finer clayey soft interbed material (1/2"-1" thick), limestone exhibits fine bedding laminations with dark brown/black shining on parting surfaces	Silty sand interbeds washed out during drilling Continued repeating sequences of thin limestone beds with fine grained interbeds separated by silty sands with limestone fragment zones 4.0-6.0' thick	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 5 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
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)	R8: 24 minutes	
80 -37.5	R9-SN 10 ft 100%	NA	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 HCl), 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	
85 -42.5					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'	Fine interbed material possibly washed out during drilling R9: 18 minutes	
90 -47.5	R10-SN				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)	Driller's Remark: Lost drilling fluid (bentonite mud) circulation	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 6 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
10 ft -52.5	100%	NA	NA		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		
95 -52.5					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'	R10: 26 minutes	
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		
100 -57.5	R11-SN 10 ft 92%	NA	NA		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		
105 -62.5			NR		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	R11: 25 minutes	
106.0					No Recovery 105.2-106.0' Limestone 106.0-115.0' - with clayey silt with gravel-sized fragment interbeds (light 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 the surface	Approximately 50% of run limestone fragments	
110 -67.5	R12-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 7 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
115 -72.5	10 ft 100%	NA	NA		Disaggregated Limestone 115.0-116.0' - with gravel-sized limestone fragments as found in 106.0-115.0' (sharp contact) Fragmented Limestone 116.0-123.8' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl 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 HCl 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) No Recovery: 123.8-126.0'	R12: 16 minutes	
120 -77.5	R13-SN 10 ft 78%	NA	NA	116.0-126.0' - NA		Driller's Remark: 118.0-120.0' & 121.0-123.0' possible voids based on penetration rate	
125 -82.5			NR			R13: 29 minutes	
130 -87.5	R14-SN		NA		126.0-136.0' - NA		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 8 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
135 -92.5	10 ft 93%	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 HCl 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	Driller's Remark: Possible void at 131.0-133.0' based on 4" core penetration rate	
	136.0		NR		No Recovery 135.3-136.0' Limestone Fragments 136.0-144.6' - mild HCl 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%)	R14: 18 minutes	
140 -97.5	R15-SN 10 ft 86%	NA			No Recovery 144.6-146.0'	R15: 37 minutes	
	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	Disaggregated due to drilling method	
145 -102.5							
	146.0						
150 -107.5	R16-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 9 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
155 -112.5	10 ft 100%	NA	NA		Limestone Fragments 148.0-154.3' - yellowish gray, (5Y 7/2), fossiliferous with small voids (1/32"-1/8") over 10-20% of surface, few larger (1/2") cavities (fossil molds), 2"-4" horizontal partings with clayey silt and gravel-sized limestone fragment interbeds (1/2"-1-1/2" thick), interbed material exhibits low to moderate plasticity, thin zone (2"-3" thick) of friable limestone fragments and moderately graded sand-sized material, strong reaction to HCl and trace (<5%) silica grains is present at 148.6'	Disaggregated due to drilling method R16: 34 minutes	
160 -117.5	R17-SN 10 ft 94%	NA	NA		156.0-166.0' - NA 154.3-156.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, silty, sandy gravel-sized material (all carbonate derived), gravel-sized fragments friable 156.0-156.8' - yellowish gray, (5Y 7/2), fossiliferous, small voids (1/32"-1/8") over 10-20% surface, large cavities (up to 1/2" diameter and 1/2" deep), fragments subangular to subrounded in shape 156.8-158.0' - moderate yellowish brown to dark yellowish orange, (10YR 5/4 to 10YR 6/6), very friable, fine recrystallization, possible trace silica sand 158.0-163.0' - Same as 156.0-156.8' except strong HCl reaction, light gray clayey silt layer at 160.9' (low plasticity), moderate brown (5YR 3/4) poorly graded very fine sand/silt-sized material, possible trace silica sand (fine), fine clear particles (recrystallization)		
165 -122.5	166.0		NR		166.0-176.0' - NA Limestone 163.0-165.4' - light olive gray, (5Y 5/2), strong (R4), dense, hard, few small voids (1/32"-1/8") <5% surface, horizontal partings (3/4"-5" spacing), generally planar, silty with gravel-sized limestone fragments, interbeds at 164.0' (2" thick) and 164.5' (light gray N7, dry), at 164.3' very dry, powdery silt-sized interbed material No Recovery 165.4-166.0'	Assume material not recovered was lost at end of run R17: 36 minutes	
170 -127.5	R18-SN		NA				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 10 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
175 -132.5	10 ft 78%	NA			Limestone And Limestone 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), bedding planes not visible over core 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 HCl 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 HCl 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 HCl 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 HCl 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 HCl reaction, with clayey silt-sized material	R18: 16 minutes Driller's Remark: possible void from 177.0-181.0' based on advancement of 4" core barrel, void not suggested based on 100% recovery	
180 -137.5	R19-SN 10 ft 100%	NA	NA				
185 -142.5						R19: 38 minutes	
190 -147.5	R20-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 11 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
195 -152.5	10 ft 100%	NA	NA		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'	R20: 25 minutes	
200 -157.5	R21-SN 10 ft 90%	NA	NA		196.0-205.0' - with coarse sand/fine gravel-sized material (<10%), limestone fragments alternating between fine grained finely bedded 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		
205 -162.5			NR		No Recovery 205.0-206.0'	R21: 18 minutes Finished drilling on 3/14/07	
210 -167.5	R22-SN				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	Resume drilling on 3/15/07	



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 12 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
215 -172.5	10 ft 100%	NA	NA				
216.0					Limestone Fragments 216.0-219.0' - yellowish brown, medium strong to strong (R3 to R4), gravel-sized limestone fragments, little to no finer material, thin zones of grayish orange fossiliferous limestone with small voids over 10-20% of surface	R22: 11 minutes	
220 -177.5	R23-SN 10 ft 100%	NA	NA		219.0-226.0' - well graded gravel-sized limestone fragments with coarse sand-sized material, 6" zones of large fragments (>3") at 222.0' and 223.5' may represent competent beds, fragmented by drilling method		
225 -182.5						R23: 26 minutes	
226.0					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		
230 -187.5	R24-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-08	SHEET 13 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 3.5 ft bgs on 3/13/07 START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
235 -192.5	10 ft 100%	NA	NA				
236.0					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 100%	NA	NA				
245 -202.5					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	R25: 13 minutes	
246.0							
250 -207.5	R26-SN						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 DRILLING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	6"-6"-6" (N)					
42.4	0.0				Sandy Organic Topsoil 0.0-1.0' - dark brown		Water level above ground surface due to pressure head from sonic tooling "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Coring run times not recorded for I-09
5	6.0	R1-SN		Poorly Graded Sand (SP) 1.0-4.0' - grayish yellow, (5Y 5/4), fine grained, no HCl reaction, silica sand 4.0-6.0' - Same as 1.0-4.0' except yellowish gray, (5Y 8/1)			
37.4	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'			
10	10.0	R2-SN					
15	16.0				16.0-20.4' - Same as 4.0-6.0' except very poorly graded		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 2 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
22.4	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		
25 17.4	26.0			26.0-31.5' - Same as 20.0-26.0' except mottled dusky yellowish brown, (10YR 2/2), moist, fine grained		
30 12.4	5.5	R4-SN		No Recovery 31.5-36.0'		
35 7.4				Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log		
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 3 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
36.0							
40 2.4	R5-SN 10 ft 100%	NA	NA		<p>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</p> <p>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 HCl reaction, siliceous, heavily mottled</p> <p>Limestone 38.9-46.0' - yellowish gray, (5Y 7/2), dry, very fine to fine grained, strong HCl reaction, extremely weak (R0), unconsolidated and very fine grained from 41.7-41.9'</p>	NA = Not Applicable NR = No Recovery	
45 -2.6							
46.0							
50 -7.6	R6-SN 10 ft 100%	NA	NA		<p>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%)</p> <p>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</p> <p>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</p>		
55 -12.6							
56.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 4 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
60 -17.6	R7-SN 10 ft 100%	NA	NA		Limestone 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 carbonate		
65 -22.6	66.0				Limestone 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'		
70 -27.6	R8-SN 10 ft 100%	NA	NA		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 fragments up to 5-1/2"		
75 -32.6	76.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 5 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -37.6	R9-SN 10 ft 100%	NA	NA		<p>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'</p> <p>79.0-83.2' - Same as 66.0-66.5' except few extremely weak (R0) limestone fragments, up to 4" in diameter</p> <p>83.2-86.0' - Same as 66.0-66.5' except dry, one fragment (up to 1") with organic staining, few limestone fragments (up to 2" diameter)</p>		
85 -42.6	86.0				86.0-87.5' - Same as 66.0-65.5' except 20-40% poorly graded sand-sized calcareous particles, limestone fragments up to 1" diameter, 1" lens of staining dark yellowish brown (10YR 4/2)	Driller's Remark: Loss of circulation	
90 -47.6	R10-SN 10 ft 100%	NA	NA		<p>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</p> <p>Disaggregated Limestone 88.4-90.7' - gravel-sized limestone fragments, >50%, ranging in size from 1/4"-1"</p> <p>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"), 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)</p>		
95 -52.6	96.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 6 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -57.6	R11-SN 10 ft 100%	NA	NA		Disaggregated Limestone 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'		
105 -62.6	106.0				Limestone With Clayey Silt 104.5-106.0' - Same as 90.7-94.0' except no black inclusions 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'		
110 -67.6	R12-SN 10 ft 87%	NA	NA				
115 -72.6	116.0		NR		No Recovery 114.7-116.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 7 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -77.6	R13-SN 10 ft 40%	NA	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 HCl 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'		
125 -82.6	126.0	NA	NR				
130 -87.6	R14-SN 10 ft 95%	NA	NA		Limestone 126.0-126.5' - grayish orange, (10YR 7/4), moderate HCl 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 HCl 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 No Recovery 135.5-136.0'		
135 -92.6	136.0	NR	NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 8 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

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -97.6	R15-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone 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</p> <p>140.5-142.1' - Same as 136.0-140.5' except increasing percentage of silt- and sand-sized material</p> <p>142.1-145.5' - mild to strong HCl 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 interbeds, few voids or fossils</p>		
145 -102.6	146.0				<p>145.5-146.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), strong HCl reaction, sharp contact, mottled appearance, 5-10% very fine grained silica sand</p> <p>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</p> <p>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</p> <p>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")</p> <p>Disaggregated Limestone 155.3-156.0' - Same as 148.5-150.5'</p>		
150 -107.6	R16-SN 10 ft 100%	NA	NA				
155 -112.6	156.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 9 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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -117.6	R17-SN 10 ft 100%	NA	NA		<p>Disaggregated Interbedded Limestone 156.0-157.5' - Same as described above except 2" silty, very fine, dark 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</p> <p>Limestone 157.5-158.5' - yellowish gray, (5Y 8/2), fine grained, mild to moderate HCl reaction, weak (R2), few fossils or voids</p> <p>Disaggregated Interbedded Limestone 158.5-162.0' - limestone fragments less than 2", increasing silt and clay-sized content with depth</p> <p>Disaggregated Limestone 162.0-162.4' - dark yellowish brown, (10YR 4/2), poorly graded</p> <p>Disaggregated Interbedded Limestone 162.4-166.0' - Same as 150.5-155.3'</p>		
165 -122.6	166.0				<p>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</p>		
170 -127.6	R18-SN 10 ft 100%	NA	NA		<p>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</p> <p>171.3-174.5' - with large limestone fragments (3"-4")</p>		
175 -132.6	176.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 10 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
 CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
180 -137.6	R19-SN 10 ft 100%	NA	NA		<p>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'</p> <p>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</p> <p>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</p>		
185 -142.6	186.0				<p>Limestone Fragments 183.6-186.0' - limestone fragments, similar to 176.0-178.3', 50% limestone fragments (>2") exhibit bedding plane partings or fractures 3/4"-1" thick</p>		
190 -147.6	R20-SN 10 ft 100%	NA	NA		<p>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</p>		
195 -152.6	196.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 11 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -157.6	R21-SN 10 ft 100%	NA	NA		Disaggregated Interbedded 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 (1/4"-1/2" thick), angular fragments		
205 -162.6							
210 -167.6	R22-SN 10 ft 100%	NA	NA		Limestone Fragments 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 sand interbeds (<1/2" thick)		
215 -172.6							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -177.6	R23-SN 10 ft 100%	NA	NA	[Symbolic Log: Alternating 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]	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		
225 -182.6							
230 -187.6	R24-SN 10 ft 100%	NA	NA	[Symbolic Log: Coarse grained, less than 10% subangular to subrounded fragments 2" or greater]	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		
235 -192.6							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 13 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -197.6	R25-SN 10 ft 90%	NA	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'		
245 -202.6			NR		No Recovery 245.0-246.0'		
246.0					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'.	
250 -207.6	R26-SN 10 ft 85%	NA	NA				
255 -212.6			NR		No Recovery 254.5-256.0'		
256.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-09	SHEET 14 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
 CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 4.41 bgs on 3/6/07 START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -217.6	R27-SN 10 ft 100%	NA	NA		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 material from 256.0-266.0'.	
265 -222.6							
266.0					Bottom of Boring at 266.0 ft bgs on 3/12/2007		



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 1 OF 14
SOIL BORING 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

DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 1.0 ft bgs on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE				
42.0	0.0			Poorly Graded Sand (SP) 0.0-5.0' - grayish brown to moderate yellowish brown, (5Y 3/2 to 10YR 5/4), moist, fine grained, no HCl reaction, silica sand, one very pale orange (10YR 8/2), round limestone fragment 3" diameter at 4.6' with strong HCl reaction No Recovery 5.0-6.0'	Water level is 1.0' below ground surface Core run times not recorded for I-10	
5 37.0	5.0	R1-SN				
	6.0			Poorly Graded Sand (SP) 6.0-11.0' - moderate yellowish brown to very pale orange, (10YR 5/4 to 10YR 8/2), moist, fine grained, strong HCl reaction, silica sand, with carbonate fines in orange material near bottom of interval Limestone Fragments 11.0-13.0' - moderate yellowish brown transitioning to yellowish gray, (10YR 5/4 to 5Y 7/2), strong HCl reaction, very fine grained to microcrystalline, contains numerous voids surfaces, colors vary depending on voids, visible calcite crystals with visible cleavage planes 13.0-14.4' - yellowish gray, (5Y 7/2), mild HCl reaction, voids (<1/16") on 20-40% of surface Silt (ML) 14.4-15.0' - very pale orange, (10YR 8/2), strong HCl reaction, carbonate material No Recovery 15.0-16.0' Silt (ML) 16.0-16.5' - very pale orange, (10YR 8/2), strong HCl reaction, carbonate material Limestone Fragments 16.5-19.6' - very pale orange, (10YR 8/2), strong HCl reaction, limestone fragments up to 4" in diameter with sections of pulverized rock less than 1" in diameter, voids (<1/16") on 20-40% of surface, poorly fossiliferous		
10 32.0	9.0	R2-SN				
15 27.0	16.0					
20						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 2 OF 14
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
22.0	10.0	R3-SN		Limestone Fragments 19.6-26.0' - grayish orange, (10YR 7/4), mild HCl reaction, fine sand-sized to fine gravel-sized (up to 1") limestone fragments, highly fossiliferous, limestone has immediate mild HCl reaction, carbonate materials		Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved)
25 17.0	26.0		26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction			
30 12.0	10.0	R4-SN	29.5-31.4' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, fragments up to 7" with interbedded clays, poorly fossiliferous, voids (<1/16") on 50-75% of surface 31.4-36.0' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, fragments up to 3" with surface voids, moderately fossiliferous			
35 7.0	36.0		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			
40						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 3 OF 14
SOIL BORING 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
 DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
 WATER LEVELS : 1.0 ft bgs on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)					
	#	TYPE				
2.0	10.0	R5-SN		<p>Limestone Fragments 41.4-42.7' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, fragments up to 2", voids (<1/16") on 15-30% of surface, poorly fossiliferous</p> <p>Disaggregated Interbedded Limestone 42.7-44.2' - Same as 36.0-41.4'</p>		
45 -3.0	46.0			<p>Limestone Fragments 44.2-44.9' - Same as 41.4-42.7'</p> <p>44.9-46.0' - dark yellowish brown, (10YR 4/2), moderate to strong HCl reaction, carbonate materials, coarse sand-sized to gravel-sized limestone fragments</p> <p>46.0-56.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), moderate to strong HCl reaction, fine to coarse sand-sized and fine to coarse gravel-sized limestone fragments in varying amounts throughout interval, isolated limestone core segment (1" long) at 47.4' with strong HCl reaction and voids (<1/16") covering 50-75% of surface, black (N1) organic staining at 53.9-54.3'</p>		
50 -8.0	10.0	R6-SN				
55 -13.0				Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log		
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 4 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
56.0			NA		Limestone Fragments With Silt 56.6-64.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. NA = Not Applicable NR = No Recovery	
60 -18.0	R7-SN 10 ft 100%	NA	NA				
65 -23.0					Limestone Fragments 64.0-66.0' - moderate yellowish 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	
66.0			NA				
70 -28.0	R8-SN 10 ft 100%	NA	NA				
75 -33.0							
76.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 5 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		ROD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
80 -38.0	R9-SN 10 ft 100%	NA	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	
85 -43.0							
86.0							
90 -48.0	R10-SN 10 ft 100%	NA	NA		86.0-96.0' - NA Disaggregated Limestone 88.6-89.2' - dusky yellowish brown, (10YR 2/2), strong HCl reaction, carbonate material Limestone Fragments 89.2-96.0' - moderate yellowish brown, (10YR 5/4), moderate HCl 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	
95 -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
 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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
100 -58.0	R11-SN 10 ft 100%	NA	NA		Limestone Fragments 96.0-106.0' - Same as 89.2-96.0'	Lost circulation during run at 96.0-106.0'	
105 -63.0							
106.0							
110 -68.0	R12-SN 10 ft 100%	NA	NA		106.0-116.0' - dark yellowish orange, (10YR 6/6), moderate to strong HCl 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	
115 -73.0							
116.0							



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

CORING METHOD AND EQUIPMENT : Rotasonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical

WATER LEVELS : 1.0 ft bgs on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
120 -78.0	R13-SN 10 ft 100%	NA	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	End coring for the day 3/25/07 at 116.0'	
125 -83.0	126.0				Silt (ML) 124.8-126.0' - yellowish gray to pale greenish yellow, (5Y 7/2 to 10YR 8/2), strong HCl reaction, carbonate material Limestone Fragments 126.0-134.0' - dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), mild HCl 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'	
130 -88.0	R14-SN 10 ft 95%	NA	NA		Limestone Fragments 126.0-134.0' - dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), mild HCl reaction, core segments and fragments of limestone with sections of pulverized rock, voids (<1/16") on 15-25% of surface		
135 -93.0	136.0		NR				



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 8 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
140 -98.0	R15-SN 10 ft 100%	NA	NA		<p>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'</p> <p>No Recovery 135.5-136.0'</p> <p>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)</p> <p>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</p> <p>140.2-144.5' - dusky yellow, (5Y 6/4), mild HCl reaction, pulverized limestone in medium to fine sand-size particles and rock fragments up to 3" in diameter</p> <p>144.5-146.0' - light olive gray, (5Y 6/1), moderate HCl reaction, core segments up to 4" in length, trace voids on surface</p> <p>146.0-147.9' - light olive gray, (5Y 6/1), mild to moderate HCl reaction, trace voids on surface</p> <p>147.9-152.0' - dusky yellow, (5Y 6/4), moderate HCl reaction, gravel-sized limestone fragments with pulverized limestone (silt-sized particles)</p>		
145 -103.0	146.0						
150 -108.0	R16-SN 10 ft 100%	NA	NA		<p>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</p> <p>153.3-154.5' - Same as 147.9-152.0' except contains a core segment up to 4" in length</p> <p>154.5-156.0' - Same as 152.0-153.3'</p>	Repeating alternating sequences from 147.9-156.0'	
155 -113.0	156.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 9 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
160 -118.0	R17-SN 10 ft 100%	NA	NA		<p>Limestone Fragments 156.0-161.2' - dusky yellow, (5Y 6/4), mild HCl reaction, fragments up to 4" in diameter, voids (<1/16") on 25-50% of surface, sections of coarse to medium sand-sized particles of pulverized limestone</p> <p>161.2-166.0' - light olive gray, (5Y 5/2), dense, fine grained, mild HCl reaction, fragments and core segments up to 2" in length, trace voids on surface</p>		
165 -123.0	166.0				<p>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</p> <p>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</p>		
170 -128.0	R18-SN 10 ft 100%	NA	NA				
175 -133.0	176.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
180 -138.0	R19-SN 10 ft 100%	NA	NA		<p>Disaggregated Limestone 175.7-176.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, carbonate sand with 10-20% silica content</p> <p>Limestone Fragments 176.0-179.9' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, gravel-sized particles between 1/4"-1" in diameter, all carbonate materials</p> <p>179.9-185.0' - dusky yellow, (5Y 6/4), strong HCl 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'</p>		
185 -143.0	186.0				<p>185.0-186.0' - light olive gray, (5Y 6/1), fine grained, mild HCl reaction, core segments up to 3" in length</p> <p>Disaggregated Limestone 186.0-186.5' - light olive gray, (5Y 6/1), strong HCl reaction, silt-sized with coarse sand-sized particles, possibly slough material, all carbonate material</p> <p>Limestone Fragments 186.5-187.5' - light olive gray, (5Y 6/1), dense, fine grained, mild HCl reaction, core segments up to 2" in length, fragments 1/4"-1" in diameter</p> <p>187.5-194.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, core segments up to 3" in length, fragments 1/2"-2" in diameter, moderate to highly fossiliferous, numerous surface cavities present on limestone</p>		
190 -148.0	R20-SN 10 ft 87%	NA	NA				
195 -153.0	196.0		NR		No Recovery 194.7-196.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
200 -158.0	R21-SN 10 ft 100%	NA	NA		<p>Limestone Fragments</p> <p>196.0-198.0' - light olive gray, (5Y 5/2), strong HCl reaction, silt with sand-sized particles and gravel-sized limestone fragments, all carbonate</p> <p>198.0-200.0' - light olive gray, (5Y 6/1), fine grained, mild HCl 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</p> <p>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'</p>		
205 -163.0					<p>205.0-206.0' - light olive gray, (5Y 6/1), very fine grained, moderate HCl reaction, fragments and core segments up to 4" in diameter</p> <p>206.0-216.0' - light olive gray, (5Y 6/1), strong HCl 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 HCl reaction, at 210.0-210.4', 211.3-211.4' and 214.6-215.0'</p>		
210 -168.0	R22-SN 10 ft 100%	NA	NA				
215 -173.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 12 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
220 -178.0	R23-SN 10 ft 100%	NA	NA		Limestone Fragments 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, void rich, poorly fossiliferous 221.4-222.2' - Same as 217.5-219.2' 222.2-225.0' - Same as 219.2-221.4'	Apparent repeating sequences at 217.5-225.0'	
225 -183.0	226.0				Disaggregated Limestone 225.0-226.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, carbonate material Limestone Fragments 226.0-236.0' - dark yellowish orange, (10YR 6/6), sand-sized particles to gravel-sized limestone fragments, strong HCl reaction for the silt and sand-sized particles, mild to moderate HCl 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 HCl reaction, or as void rich, yellowish gray (5Y 7/2), poorly fossiliferous, with mild to moderate HCl reaction	Silt and limestone fragments are most likely cohesive rock that has been broken up by the sonic drilling method	
230 -188.0	R24-SN 10 ft 100%	NA	NA				
235 -193.0	236.0						



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 13 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
240 -198.0	R25-SN 10 ft 100%	NA	NA		Limestone Fragments 236.0-246.0' - Same as 226.0-236.0' except with isolated sections of fine grained and void-rich limestone		
245 -203.0							
246.0							
250 -208.0	R26-SN 10 ft 100%	NA	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	
255 -213.0							
256.0							



PROJECT NUMBER: 338884.FL	BORING NUMBER: I-10	SHEET 14 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

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 on 03/25/07 START : 3/25/2007 END : 3/26/2007 LOGGER : J. Burkard

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
260 -218.0	R27-SN 10 ft 100%	NA	NA		Limestone Fragments 256.0-266.0' - Same as 226.0-236.0'		
265 -223.0							
266.0					Bottom of Boring at 266.0 ft bgs on 3/26/2007	Completed drilling hole at 16:40 on 3/26/07 to 266.0', however total depth tagged on 3/27/07 at 267.0' below ground surface	
						Borehole grouted to surface with 4" schedule 40 PVC pipe down hole; depth inside PVC pipe re-tagged at 267'3" below ground surface after grouting	



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 1 OF 8
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
20.9	0.0	1.2	SS-1	1-5-10 (15)	Topsoil 0.0-0.2' - roots Sandy Silt With Limestone Fragments (ML) 0.2-1.2' - grayish orange, (10YR 7/4), orange, dry to moist, medium stiff, nonplastic, strong HCl reaction, 30 % fine to coarse sand-sized material, 30% fine to coarse gravel-sized material		SS-1 looks like fill, mixed chunks of material Driller's Remark: Sand at 3.0-3.5'
15.9	5.0	0.6	SS-2	2-3-4 (7)	Poorly Graded Sand With Silt (SP-SM) 5.0-5.6' - moderate yellowish brown, (10YR 5/4), moist to wet, loose, no to moderate HCl reaction, fine silica sand, trace medium grained carbonate sand, trace nonplastic fines		
10.9	10.0	0.6	SS-3	3-3-3 (6)	Poorly Graded Sand With Silt (SP-SM) 10.0-10.3' - Same as 5.0-5.6' except dark yellowish brown, (10YR 4/2), mottled, 5-10% nonplastic fines, trace medium sand-sized carbonate sand Poorly Graded Sand With Silt And Organics (SP-SM) 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		
5.9	15.0	0.8	SS-4	5-7-11 (18)	Poorly Graded Sand (SP) 15.0-15.8' - dark yellowish brown, (10YR 4/2), white, moist, medium dense, nonplastic, no HCl reaction, fine silica sand		
20							



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 2 OF 8
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
0.9	20.0	0.9	SS-5	11-10-13 (23)	[Symbolic Log: Dotted pattern]	
	21.5					
	25.0				[Symbolic Log: Dotted pattern]	
	26.5	0.8	SS-6	4-5-5 (10)		
25 -4.1	30.0				[Symbolic Log: Dotted pattern]	
	31.5	0.9	SS-7	2-3-4 (7)		
30 -9.1	35.0				[Symbolic Log: Dotted pattern]	Driller's Remark: Very soft at 33.0', possible change of material in SS-8
	36.5	1.5	SS-8	0-0-0 (0)		
35 -14.1					[Symbolic Log: Dotted pattern]	Driller's Remark: Gravelly material at 38.0' (like SS-9)
	40					



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 3 OF 8
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-19.1	40.0	1.3	SS-9	3-5-8 (13)		
	41.5					
45	45.0					Driller's Remark: 100% loss of circulation at 44.0-44.5'
-24.1	46.5	0.8	SS-10	12-41-40 (81)		Finished drilling at 45.0' at end of 6/27/07 at 18:00 Driller set HW casing Driller's Remark: Caving at 16.0-17' (possible water table); casing is dry up to 43.5'. On 6/28/07 water table is at 42.0'; resume drilling at 07:30 AM Driller's Remark: Alternating layers of soft and hard material between 45.0-50.0'; lost circulation at 45.0'
50	50.0					
-29.1	51.5	1.4	SS-11	31-27-17 (44)		
55	55.0					
-34.1	55.6	0.5	SS-12	50-50/1.5 (100/7.5")		Driller's Remark: Change to SS-13 material at 58.0'; Install casing to 60.0'
60						



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 4 OF 8
SOIL BORING 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
 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-39.1	60.0	1.2	SS-13	16-19-25 (44)		Driller's Remark: Circulation lost after spoon
	61.5					Driller's Remark: Hard at 62.0'
65	65.0					Driller's Remark: Softer at 64.0', circulation returns, installed 10' more casing (to 65.0')
-44.1	65.3	0.3	SS-14	50/3.0 (50/3.0")		Driller's Remark: 65.0-70.0' drilling hard, a little chatter at 69.5'
70	70.0					Driller's Remark: Hard from 70.0-75.0', little chatter
-49.1	0.0	0.0	SS-15	50/1.0 (50/1.0")		
75	74.9					
-54.1	0.0	0.0	SS-16	50/1.5 (50/1.5")		Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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)
 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
 WATER LEVELS : 42.0 ft bgs on 6/28/07 START : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-54.1	75.0 R1-HQ 1 ft 100%	100	0		Limestone 75.0-76.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 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	Switch to coring; finished soil drilling at 15:30 on 6/28/07 R1: 3 minutes	
76.0	100%		0		76.0-77.55' - Same as 75.0-76.0' except moderate yellowish brown to dark yellowish orange, (10YR 5/4, 10YR 6/6), weak to very weak (R2 to R1), voids (up to 1/16") cover 5-25% of the surface area, voids coverage decreases with depth	SC-1 collected at 78.5-79.5'	
80	R2-HQ 5 ft 100%	97	1		77.4' - Fracture, 30 deg, rough, undulating, healed 77.75' - Fracture, horizontal, rough, planar, tight 78.3' - Fracture, horizontal, rough, planar to undulating, tight	Drilled twice as fast from 79.5-81.0' R2: 17 minutes	
-59.1			1		77.55-79.5' - light olive gray, (5Y 5/2), fine to coarse grained, moderate HCl 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		
81.0			1		81.9' - Fracture, horizontal, rough, planar		
			1		82.35' - Fracture (2), 30 deg, rough, planar, with a 1" fragment wedge between 2 fractures		
	R3-HQ 5 ft 100%	63	1		83.95' - Fracture, 50 deg, rough, stepped, tight		
85			2		84.55' - Fracture, 10 deg, rough, planar		
-64.1			>10		84.85' - Fracture, 60 deg, rough, undulating, leading to fracture zone at 85.0' 85.0-85.15' - Fracture zone, small 1/4 and smaller	R3: 8 minutes	
			3		85.15, 85.4, 85.75' - Fracture (3), 10 deg, rough, undulating to stepped		
			3		85.5' - Fracture, 80 deg, rough, undulating to stepped, from 85.15 to 85.75		
	R4-HQ 5 ft 88%	35	3		85.85' - Fracture, 70 deg, rough, undulating, from 85.75 to 86.0 continuation of overlying fracture		
			>10		86.2' - Fracture, 75 deg, rough, undulating, tight to open 86.55' - Fractures, horizontal, rough, stepped, very open fracture with significant fragmentation and debris, nearly fracture zone infill	Driller's Remark: 50% circulation loss	
90			5		87.0, 87.2' - Fracture (2), 10 deg, rough, planar, open, rounded	R4: 9 minutes	
-69.1			NR		87.65' - Fracture, 10 deg and 30 deg, rough, undulating, open		
			8		88.45' - Fracture, horizontal, rough, undulating to stepped, tight to healed	Driller's Remark: 100% circulation loss as soon as drilling starts at 91.0'; 100% loss through to 96.0'	
			3		88.75' - Fracture, 75 deg, rough, stepped, tight, bounded by fractures at 88.15 and 89.15'		
	R5-HQ 5 ft 68%	28	7		89.15' - Fracture, 20 deg, rough, stepped, very open with fragmentation		
			0		89.5-89.8' - Fracture zone		
95					No Recovery 90.4-91.0'		



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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 AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES				SYMBOLIC LOG	LITHOLOGY	COMMENTS
		R Q D (%)	FRACTURES PER FOOT	DESCRIPTION				
				DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS				
-74.1			NR	89.8' - Fracture, 30 deg, rough, undulating, open to fracture zone		Limestone 91.0-91.65' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak (R2), voids cover 25% of the surface, 3% gray voids, same as 88.6-88.7' 91.65-93.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, strong (R4), transition to moderate yellowish brown particularly at the top and bottom, voids (up to 1/16") cover 15-20% of the surface, 1/2" cavities and fossil casts 93.0-94.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), 5% rounded coarse fragments, voids (up to 1/16") cover 10% of the surface No Recovery 94.4-96.0' Limestone 96.0-98.1' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover 30-40% of the surface, trace elongate cavities up to 3/4"X1/4", trace organics (up to 1/4") 98.1-101.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to very weak (R2 to R1), voids (up to 1/16") cover 5-15% of the rock surface, organics (up to 1/8" long) 101.0-103.5' - Same as 96.0-98.1' except very weak to weak (R1 to R2), the rock is gray where it is stronger, 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 casts, more voids in 103.2-103.5' 103.5-105.15' - light olive gray, (5Y 5/2), fine to very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids (up to 1/16") cover 10-15% of the surface, cavities (up to 1/4") cover 5% of the surface and frequency decreases with depth, rare larger cavities also decreasing with depth 105.15-105.8' - Same as 101.0-103.5' except steep increase in voids, more brownish No Recovery 105.8-106.0'	R5: 15 minutes	
96.0			0	90.05' - Fracture, 20 deg, rough, stepped, very open			Added EZ-Mud, still 100% water loss	
			0	90.2' - Fracture, 70 deg, rough, undulating, fracture to fragmentation				
			0	91.25' - Fracture, 30 deg, smooth, undulating				
			2	91.45, 91.5, 91.6, 91.65' - Fracture (4), horizontal, rough, planar, open fragmentation (sub angular) from 91.6-91.65'				
	R6-HQ 5 ft 100%	62	2	92.2' - Fracture, 40 deg, rough, planar, healed with trace fragmentation (sharp angular)				
			3	92.35' - Fracture, 20 deg, rough, planar, fragments, joins with 92.2 fracture				
100			>10	92.55' - Fracture, horizontal, smooth, planar				
-79.1			>10	93.0' - Fracture, 70 deg, rough, undulating, tight			R6: 5 minutes	
			0	93.2' - Fracture, 20 deg, rough, undulating, tight				
			1	93.65' - Fracture, 70 deg, rough, undulating, tight				
			1	93.8-93.95' - Fracture zone				
			1	93.95' - Fracture, 10 deg, rough, stepped, open				
	R7-HQ 5 ft 96%	77	1	98.3' - Fracture, 25 deg, rough, undulating, tight				
			1	98.55' - Fracture, 80 deg, rough, undulating, that starts at 98.3 and ends as unbroken fracture at 98.8,			100 % water loss from 101.0-106.0'	
105			2	99.45' - Fracture, 50 deg, rough, planar, tight				
-84.1			NR	99.6' - Fracture, 70 deg, rough, undulating to planar, tight extends from 99.45 to 99.65'		R7: 14 minutes		
			>10	99.65' - Fracture, 30 deg, rough, planar, tight				
			>10	100.1' - Fracture, horizontal, rough, stepped, open to fracture zone below				
			>10	100.1-100.7' - Fracture zone, with several large 3" subangular fragments and several 0 to 70 degree fractures				
			>10	100.7' - Fracture, horizontal, rough, stepped, very weak (R1) rock and rounded core with faded color				
	R8-HQ 5 ft 100%	0	>10	102.85' - Fracture, 60 deg, rough, undulating, healed				
			>10	103.45' - Fracture, 25 deg, rough, undulating, open				
			>10	103.65' - Fracture, horizontal, rough, stepped, very open		R8: 7 minutes		
			>10	104.25' - Fracture, 10 deg, rough, stepped, very open fracture with some fragments				
			>10	105.15' - Fracture, 50 deg, rough, undulating, healed		100% circulation loss from 111.0-116.0'		
			>10	105.35-105.45' - Fracture zone, rough, planar				
			2	106.3' - Fracture, 20 deg, rough, undulating, open				
	R9-HQ 5 ft 84%	25	2	106.55' - Fracture, 20 deg, rough, undulating to stepped, very open fracture				
			0	106.7-106.85' - Fracture zone, 30 deg and 60 deg, subrounded				
115								



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 7 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 AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		R Q D (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
-94.1			>10		Limestone 106.0-106.7' - moderate to dark yellowish brown, (10YR 5/4, 10YR 5/6), fine grained, moderate HCl reaction, medium strong (R3), voids (up to 1/16") cover 30% of the surface, 1" long elongated fossil molds and casts, slightly stronger where mottled as 105.15-105.8'	R9: 4 minutes	
116.0			NR		106.75-109.85' - Same as 106.0-106.7' except extremely weak (R0), transitioning gradually from 108.5-109.5' as very weak rock (R1) with voids (up to 1/16") cover 20% of the surface, trace fine organics	100% circulation loss from 116.0-121.0'	
	R10-HQ 5 ft 100%	63	>10		107.15, 107.5' - Fracture (2), 80 deg, rough, undulating, stained 107.65' - Fracture, 10 deg and vertical, break, angular 107.75' - Fracture, 10 deg, rough, stepped, open, abrupt transition to material below		
			0		107.75-108.75' - Fracture zone, horizontal and vertical, present significant 1/4" fragments		
120			>10		108.75-109.85' - Fracture zone, angular fragments	R10: 5 minutes	
-99.1			2		109.85' - Fracture, vertical, rough, undulating, 10" long fracture		
			>10		110.6-111.0' - Fracture, horizontal, rough, undulating, fracture zone, sub angular, 1-2" fragments to end of core	100% circulation loss from 121.0-126.0'	
			4		111.0-111.95' - Fracture zone, vertical, 1-4" subangular fragments		
	R11-HQ 5 ft 98%	63	0		111.95, 112.35' - Fracture, horizontal, rough, undulating, open to fracture zone at 112.35	SC-2 collected at 122.9-124.0'	
			0		112.9' - Fracture, horizontal, rough, planar		
			3		113.5' - Fracture, 45 deg, rough, planar, fragmentation along plane, closely spaced fractures, tight to open		
125			>10		113.9' - Fracture, 20 deg, rough, undulating, open	R11: 5 minutes Driller's Remark: Used 1200 gallons of water at hole; water 25.0' below ground surface before grouting at 6/29/07 at 14:00	
-104.1			NR		115.0-115.2' - Fracture zone, sand and sub angular fragments		
					116.0-116.4' - Fracture zone, sub angular fragments, sand to 1" fragments		
					116.4' - Fracture, horizontal, rough, stepped, very open		
					116.85' - Fracture, 60 deg, smooth, undulating, tight		
					118.05' - Fracture, 60 deg, rough, undulating, similar to fracture above in size and orientation but followed at depth by crush		
					118.2-118.45' - Fracture zone, sand to 1" subangular fragments		
					118.45, 118.65' - Fractures (2), horizontal, rough, stepped, tight to open, fracture at 118.65 also splits off at 60 degree near one side		
					119.15' - Fracture, 10 deg, rough, planar, tight to healed		
					119.8' - Fracture, 15 deg, rough, undulating, tight		
					120.5, 120.55' - Fracture, horizontal, rough, planar, tight		
					120.55-120.8' - Fracture zone, sand to gravel sized fragments, weakly to non competent		
					120.8' - Fracture, horizontal, rough, undulating to stepped		
					121.5' - Fracture, 50 deg, smooth, undulating, open, with fragmentation to smaller orthogonal fractures at same depth		



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-01	SHEET 8 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 AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing 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

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
					118.65-120.3' - Same as 116.75-118.15' except weak to medium strong (R2 to R3) Limestone 120.3-121.0' - Same as 116.0-116.75' except extremely weak to very weak (R0 to R1) 121.0-125.9' - moderate yellowish brown to dark yellowish orange, (10YR 5/4, 10YR 6/6), fine grained, moderate HCl reaction, very weak to medium strong (R1 to R3), gradual transitions, voids (up to 1/16") cover 10-25% of the surface, trace open cavities (1/4"), larger completely infilled cavities over 2% of the surface, 121.0-124.0' medium strong (R3), larger cavities (inches long) are infilled with weaker rock with voids cover 25% of the surface, percent of voids decreases to 10-15% with depth, 124.0-125.9' increasing weakness, very weak (R1) at bottom No Recovery 125.9-126.0' Bottom of Boring at 126.0 ft bgs on 6/29/2007		
			121.75' - Fracture, 50 deg, smooth, undulating, tight to healed fracture with some orientation as 121.5 fracture 124.05' - Fracture, 25 deg, rough, undulating, some fragmentation 124.55' - Fracture, 60 deg, rough, undulating, open fracture with a near horizontal fracture and fragmentation 125.45' - Fracture, horizontal, smooth, undulating, open 125.45-125.9' - Fracture zone, fracture zone with sub angular fragments 1/2-2" in size				



PROJECT NUMBER: 338884.FL	BORING NUMBER: IT-02	SHEET 1 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
 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 : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)			6"-6"-6" (N)			
29.6	0.0	1.0	SS-1	0-2-3 (5)	Poorly Graded Sand With Silt To Silty Sand (SP-SM/SM) 0.0-1.0' - pale yellowish brown to moderate brown, (10YR 6/2 to 5YR 4/4), moist, loose, fine to medium grained, moderate HCl reaction in carbonate materials, mixed carbonate and silica grains, 10-20% nonplastic fines, trace roots		SS-1 appears to be fill
	1.5						
5	5.0	1.0	SS-2	11-12-13 (25)	Poorly Graded Sand With Silt (SP-SM) 5.0-6.0' - pale brown with grayish brown, (5YR 5/2 with 5YR 3/2), moist to wet, medium dense, fine grained, no HCl reaction, silica sand, 5-10% nonplastic fines		
24.6	6.5						
10	10.0	0.7	SS-3	4-7-11 (18)	Poorly Graded Sand (SP) 10.0-10.7' - light brownish gray grading to yellowish gray, (5YR 6/1 to 5Y 8/1), moist, medium dense, fine grained, no HCl reaction, silica sand, 5-10% nonplastic fines grading to <5%		
19.6	11.5						
15	15.0	0.7	SS-4	6-7-6 (13)	Poorly Graded Sand (SP) 15.0-15.7' - Same as 10.0-10.7' except trace, nonplastic fines, trace fine organics		
14.6	16.5						
20							



PROJECT NUMBER: 338884.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
 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 : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		#TYPE	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)			6"-6"-6" (N)			
9.6	20.0	0.9	SS-5	4-6-9 (15)	Poorly Graded Sand (SP) 20.0-20.9' - brownish gray, (5YR 4/1), moist to wet, medium dense, fine to medium grained, no HCl reaction, silica sand, 5% nonplastic fines		SS-5 is coarser grained than previous samples
	21.5						
					Cuttings from bit above SS-6 are Fat Clay (CH) - greenish gray (5G 6/1), wet, high plasticity, no dilatancy, no HCl reaction		
25	25.0	0.0	SS-6	50/1" (50/1")	No Recovery 25.0-25.1' 25.0' - a few coarse grained limestone fragments, very mild HCl reaction		Driller's Remark: Hard at 24.5'
4.6							Driller's Remark: 100% circulation loss at 26.0'; grinding to 26.0-26.5'; then softer drilling (still hard)
30	30.0	0.9	SS-7	15-31-61 (92)	Limestone And Silty Sand (SM) 30.0-31.5' - medium gray, light olive gray and yellowish gray, (N5, 5Y 6/1 and 5Y 8/1), wet, dense, strong HCl 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		Driller's Remark: 30.0-35.0' medium hard, no circulation
-0.4	31.5						
35	35.0	0.0	SS-8	50/2" (50/2")	No Recovery 35.0-35.2'		Driller's Remark: Softer at 34.5'
-5.4	35.2						
40							



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
 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 : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION		SYMBOLIC LOG	COMMENTS
	RECOVERY (ft)	#TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
				6"-6"-6" (N)			
-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 HCl 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 HCl reaction		Driller's Remark: No circulation at 40'.0 (below casing)
	41.5						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.
45	45.0	0.0	SS-10	50/3" (50/3")	No Recovery 45.0-45.3' 45.0' - a few limestone fragments and cuttings, light olive gray (5Y 5/2), highly fossiliferous, mild to moderate HCl reaction		Driller's Remark: Circulation regained after casing set to 45.0' Driller's Remark: 45.0-50.0' not as hard as above
-15.4	45.3						
50	50.0	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')		Driller's Remark: 50.0-55.0' drills hard and soft (alternates), feels like lenses SS-11 does not have massive appearance
55	51.5						
-25.4	55.0	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 fragment at top of sample, highly fossiliferous		
	56.5						
60							



PROJECT NUMBER: 338884.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
 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 : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	RECOVERY (ft)	#TYPE				
-30.4	60.0	1.1	SS-13	24-8-7 (15)	<p>Limestone 60.0-60.3' - mild HCl reaction, in 1/4" pieces, same as limestone fragment in SS-12</p> <p>Silty Sand With Limestone Fragments (SM) 60.3-61.1' - mottled light olive gray, (5Y 5/2), wet, medium dense, fine to coarse grained, mild to moderate HCl reaction, similar to SS-11 and SS-12, all carbonate materials, 15-35% nonplastic fines varied in lenses, 15% fine gravel-sized limestone</p>	<p>Finished drilling at 60.0' on 7/1/2007, HW casing to 45.0' Resume drilling at 7:30 7/2/2007</p>
	61.5					
-35.4	65.0	1.0	SS-14	24-55-48 (103)	<p>Silty Sand (SM) 65.0-66.0' - mottled light olive gray to medium gray, (5Y 5/2 to N5), wet, very dense, predominantly fine to medium grained, mild to moderate HCl reaction, similar to above, all carbonate materials, 5-10% coarse sand, 20-40% fines (varies in lenses)</p>	<p>SS-9 through SS-14: Darker gray colors more associated with coarser lenses</p>
	66.5					
-40.4	70.0	1.1	SS-15	18-27-31 (58)	<p>Silty Sand (SM) 70.0-71.1' - pale to moderate yellowish brown with scattered medium gray lenses, (10Y 6/2 to 10YR 5/4 with N5), wet, very dense, fine to medium grained, mild to moderate HCl reaction, similar to above, 35% nonplastic fines</p>	<p>Driller's Remark: Materials are not coreable (wash out of core barrel) SS-9 through SS-15 appear to be interbedded carbonate silts, sands with some gravels and limestone lenses are irregularly shaped and sized.</p>
	71.5					
-45.4	75.0	0.0	SS-16	50/1.5" (50/1.5")	<p>No Recovery 75.0-75.1'</p>	<p>Driller's Remark: Still in and out of harder and softer lenses</p>
	75.9					
80						



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 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 : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)		STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	SYMBOLIC LOG	COMMENTS	
	RECOVERY (ft)	#TYPE					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-50.4	80.0	0.8	SS-17	41-50/5" (91/11")	<p>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% nonplastic fines, 15-20% fine gravel-sized limestone</p> <p>Mixed Materials 80.7-80.8' - moderate yellowish brown to dark yellowish brown to dusky brown, (10YR 5/4 to 10YR 4/2 to 5YR 2/2), moist, moderate HCl reaction, lense of mixed silts, fine to coarse sand-sized angular limestone and organic soil</p>	<p>SS-17: Lenses of limestone pieces throughout sample, much more than previous samples. Driller's Remark: 80-85 still drilling hard and soft, material is likely to wash out of core barrel</p>	
80.9							
85	85.0	1.1	SS-18	5-8-9 (17)	<p>Sandy Clay With Silt (CL-ML) 85.0-86.1' - moderate yellowish brown, (10YR 5/4), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 5-10% very fine to fine sand, all carbonate</p>	<p>Driller's Remark: 100% water loss at 88.0' Driller's Remark: Extremely soft at 88.5', possibly cavity</p>	
-55.4	86.5						
90	90.5	0.4	SS-19	50/5" (50/5")	<p>Silty 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</p> <p>Begin Rock Coring at 91.0 ft bgs See the next sheet for the rock core log</p>	<p>Driller's Remark: For SS-19 rods dropped to 90.5', SPT taken at 90.5', potential cavity from 88.5-90.5'</p>	
-60.4	90.9						
95							
-65.4							
100							



PROJECT NUMBER: 338884.FL	BORING NUMBER: 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
 WATER LEVELS : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN LENGTH AND RECOVERY (%)	DISCONTINUITIES		SYMBOLIC LOG	LITHOLOGY	COMMENTS	
		RQD (%)	FRACTURES PER FOOT				DESCRIPTION
							DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS
115 -85.4	R5-HQ 5 ft 8%	0	NR	>10	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 HCl 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 R5: 1 minute
120 -90.4	R6-HQ 5 ft 20%	13	NR	2	116.0-116.2' - Fracture zone, rough, undulating, several small fragments (0.5-1.5") 116.6' - Fracture, horizontal for lower face, 50 deg for upper face, open, film of silty fine sand on lower face	Limestone 116.0-117.0' - yellowish gray transitions to light olive gray by 116.3', (5Y 7/2 to 5Y 6/1), fine grained, mild to moderate HCl reaction, strong (R4), voids (<1/16") over 5% of surface, trace larger voids (up to 3/16") No Recovery 117.0-121.0'	R6: 2 minutes
125 -95.4	R7-HQ 5 ft 92%	0	0	0	121' - Unconsolidated material. No fractures.	Poorly Graded Sand With Silt (SP) 121.0-125.6' - light gray to light olive gray, (N7 to 5Y 6/1), wet/saturated, medium dense, fine grained, silica sand, about 10% fines (carbonate derived), well rounded grains, 124.4' - a 1" limestone fragment, 124.8' - fines increasing to about 50%, color change to olive gray (5Y 3/2) No Recovery 125.6-126.0'	R7: 1 minute
			NR			Bottom of Boring at 126.0 ft bgs on 7/2/2007	

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-1

ELEVATION (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 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
	0					0.0-20.0' Sand-fine grained.	sp	Destructive drilling from 0-20'. Log based on drill cuttings.
	2							
	4							
	6							
	8					As above except with Dolomite layers, little clay.	sp	
	10							
	12							
	14							




DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-1

ELEVATION (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 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
	30				[Hatched Pattern]			
	32				[Hatched Pattern]			
	34				[Hatched Pattern]			
	36				[Hatched Pattern]	35.0-45.0' DOLOMITE (tan), replacing limestone (gray), highly weathered.		Driller notes hard area starting at 33'.
	38				[Hatched Pattern]			
	40				[Hatched Pattern]			40-45' No Recovery.
	42				[Hatched Pattern]			









DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-1

ELEVATION (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 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
	44							
	46							
	48							
	50							
	52							
-11.3	54					45.0-54.0' DOLOMITE with interbedded degraded dolomite layers (sandy texture).	cl	55.0-60.0' Drill time: 13min 18sec.
	56					54.0-57.0' Clay, low to no plasticity.		
-14.3	57					57.0-61.15' DOLOMITE.		Driller Notes: harder at 57'. Water level on 9/3/09 @ 0730 is 3.4'.
	58							

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			RIG: Failing 1500
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	60								60-62' Drill Time: 11min 20sec. Set casing at 62'.
-20.4		R-1	100% (55%)	3.85		61.15-63.1' DOLOMITE, pale yellowish brown (10YR 6/2), moderately 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
-21.1	64					63.1-63.8' CLAY, calcareous, sandy, no plasticity, some dolomite fragments throughout.	63.1'	cl	
						63.8-65.5' DOLOMITE, same as above.	63.8'		
	66					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		R-2	96% (44%)	4.8		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.	69.4'	cl	
-27.3	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 sandy below 73', weak reaction to 1N HCl when powdered, some fossils. 71.2-72.1' Vertical fracture.	70'		Run-3: Drilling Pressure: 350-250 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 34sec Circulation loss: none
	72	R-3	80% (40%)	4.0		72.5' Soft zone (residual remains), silty clay, grayish brown (5YR 3/2).			




DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
-35.8 -35.9	74	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'.		cl	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', 76.2-76.5'
	76					76.5-76.7' Rubble.			
	78					78.5-78.6' Silty CLAY, grayish brown (5YR 3/2), as above. 78.6' Dolomite becomes very sandy, poorly indurated.			
	80	R-5	90% (38%)	4.5		80.0-85.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous, slightly to moderately weathered, fossiliferous, moderate reaction to 1N HCl when powdered, thick bedded.		cl	Run-5: Drilling Pressure: 350-500-300 psi Kelly Bar RPM: 198 Engine RPM: 1200 Drill Time: 29min 23sec Circulation loss: none
	82					81.7-82.0' Vertical fracture. 82.0-82.8' Dolomite becomes very sandy, severely weathered. Vuggy below 82.8'.			
	84	R-6	100% (32%)	2.5		85-85.6' DOLOMITE, pale yellowish brown (10YR 6/2), fresh, vuggy, weak reaction to 1N HCl when powdered, medium bedded, moderately hard.		cl	Run-6: Drilling Pressure: 200 psi Kelly Bar RPM: 199 Engine RPM: 1200 Drill Time: 13min 41sec (85-85.8') 13min 54sec (85.8-87.5') Circulation loss: none
	86					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.			

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			RIG: Failing 1500
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	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'. Run-8: Drilling Pressure: 500 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 23min 12sec Circulation loss: 20% Run-9: Drilling Pressure: 400 psi Kelly Bar RPM: 197 Engine RPM: 1200 Drill Time: 24min 51sec Circulation loss: 100% below 97' Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec Circulation loss: 100%
	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.							
-48.8		ROD DROP 91.5-92'.							
-49.3	92	R-8	90% (28%)	4.5		92-95.2' DOLOMITE, same as above. 92.3' Color change (gradual transition) to pale yellowish brown (10YR 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.			
	94					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.			
-54.3	96	R-9	80% (22%)	4.0		97-97.8' ROD DROP.			
-55.1	98					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. 102-102.2' Severely weathered/broken zone.							

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			RIG: Failing 1500
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	104	R-10	100% (24%)	5.0	[Pattern]	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.			Run-11: Drilling Pressure: 400 psi Kelly Bar RPM: 228 Engine RPM: 1400-1500 Drill Time: 10min 15sec Circulation loss: 100% Run-12: Drilling Pressure: 300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 13min 6sec Circulation loss: 100% Driller notes slight rod drop around 111' (2 to 3") softer material, faster drilling. 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.
	106				[Pattern]	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.			
	108	R-11	100% (56%)	5.0	[Pattern]	108-109.1' Vertical fracture.			
	110				[Pattern]	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.			
-68.3 -68.5	112	R-12	86% (28%)	4.3	[Pattern]	111.0-111.2' ROD DROP.			
	114				[Pattern]	112.7' Possible soft zone.			
	116				[Pattern]	113.7' Dolomite becomes all sandy, larger vugs, fossiliferous, moderately hard, slightly to moderately weathered.			
					[Pattern]	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.			

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	118	R-13	60% (32%)	3.0	[Pattern]	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.			Run-14: Drilling Pressure: 200-300 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 17min 30sec Circulation loss: 100%
	120				[Pattern]	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).			
	122	R-14	98% (56%)	4.9	[Pattern]	121.6-122.5' As above except no dolomite layers, intensely fractured, moderately weathered.			
	124				[Pattern]	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.			
	126				[Pattern]	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.			
-83.8					[Pattern]	126.5'			
-84.3					[Pattern]	ROD DROP 126.5-127.0'.			
-84.8		R-15	62% (26%)	3.1	[Pattern]	127.0-127.5' LIMESTONE, medium light gray (N6), strong reaction to 1N HCl, thin bedded, few fossils.			
-85.3	128				[Pattern]	127.5'			
					[Pattern]	ROD DROP 127.5-128.0'.			
					[Pattern]	128'			
					[Pattern]	128-130' DOLOMITE, as above except moderately to severely weathered, fossiliferous, vuggy, porous.			
	130				[Pattern]	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).			
					[Pattern]	130.8-131.6' As above except more porous/sandy texture, friable, moderately weathered.			

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	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, 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).			
-93.3	136	R-17	78% (20%)	3.9		ROD DROP 136-136.7'.			Run-17: 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'
-94.0	138					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.			
	140	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 grained dolomite, pale yellowish brown (10YR 6/2), fossiliferous, fresh to 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.			Water level on 9/5/09 @ 0730 is 4.4'. 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'.
	142					145-146.5' Same as above except moderately to intensely weathered.			
	144								Run-19: Drilling Pressure: 300 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 13min 49sec (145-149')
	146								




DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		RIG: Failing 1500
CHECKED BY: WDS	DRILLER: Eddie Palmer HELPER: Chad/Cody		
APPROVED BY:			
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
	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	R-20	100% (64%)	5.0		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') Circulation loss: 100%
	152					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.		
	154	R-21	92% (42%)	4.6		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: 180 Engine RPM: 1300 Drill Time: 7min 39sec (155-157') 21min 10sec (157-159') 2min 54sec (159-160') Circulation loss: 100% 155-155.6' Healed vertical fracture.
	156					156.2-157.5' As above except moderately to severely weathered, porous texture, sandy.		
-114.8	158					157.5-159' LIMESTONE, moderately hard to hard, light gray (N7) to light olive gray (5Y 6/1), medium to thick bedded, fresh to slightly weathered, moderately fractured, banded layers, strong reaction to 1N HCl.		
-116.3						159-160' DOLOMITE as at 156.2'.		
-116.5						ROD DROP 159.2-159.7'.		
-117.0	160					160-161' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous texture, moderate reaction to 1N HCl, fossiliferous, moderated weathered, thick bedded.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300




DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		RIG: Failing 1500
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	162	R-22	94% (40%)	4.7		161-161.9' Vertical fracture.			Drill Time: 10min 13sec (160-163') 6min 27sec (163-165') Circulation loss: 100%
	164					161.9-162.7' DOLOMITE, as above except slightly weathered, vuggy, some pale brown (5YR 5/2) layers/bands and trace limestone.			
	166	R-23	90% (16%)	4.5		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).			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% 165.5-166' Vertical fracture-faces stained black with white rounded calcite grains.
	168					165-167' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, moderate reaction to 1N HCl 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 HCl, hard.			
	170	R-24	100% (30%)	5.0		167-170' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard, fresh, thick bedded, few fossils, few vugs, strong reaction to 1N HCl.			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 4.5'. NOTE: Zones at 172.5' and 174' mechanically broken during removal from shoe.
	172					168.2-168.5' Vertical fracture. 168.3-170' As above except intensely fractured (possibly mechanical).			
	174					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-25: Drilling Pressure: 300-250 psi
						172-172.5' Intensely fractured.			
						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 to 1N HCl, crystalline, no fossils, thick bedded, moderately to intensely fractured (possibly mechanical), fresh to slightly weathered, few vugs.			

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			DESCRIPTION
176	176 178	R-25	90% (38%)	4.5		175-180' DOLOMITE, moderately soft to moderately hard, pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6), thick 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.		Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 30min 5sec Circulation loss: 100% Driller Notes: 175-176' very soft.
						177.6' Dolomite becomes moderately fractured, vuggy.		
180	180 182	R-26	100% (0%)	5.0		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') Circulation loss: 100%
						181.6' Very thin sandy CLAY layer, no plasticity, moderate yellowish brown (10YR 5/4)-in between a horizontal fracture.		
184	184 186	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.		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.
						187' Becomes moderately to severely 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.		
190	190					190-190.8' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish		Run-28:

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			RIG: Failing 1500
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-1

ELEVATION (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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			DESCRIPTION
	192	R-28	100% (30%)	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 appearance, few vugs, moderately fractured, wavy basal contact.		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					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. 193.3-195' As above except fossiliferous, intensely fractured.		
	196	R-29	100% (0%)	5.0		195-196.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 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.		Run-29: Drilling Pressure: 150-200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 56min 43sec Circulation loss: 100%
	198					196.5-197.4' As above except very intensely fractured. 197.4-200' DOLOMITE, moderately hard, moderate to strong reaction to 1N HCl when powdered, banded appearance 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% (54%)	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%
	202					202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly weathered, pitted, vuggy, few thin laminae (dark gray (N3)).		
	204					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.		
	-160.8					204.1-205' DOLOMITE, pale yellowish brown (10YR 6/2), slightly to		

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS	DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:			
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-1

ELEVATION (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 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
-162.3	206 208 210 212 214 216 218				|||||	moderately weathered, pitted/vuggy, fossiliferous, moderately hard, moderate reaction to 1N HCl when powdered, thick bedded, unfractured. BOTTOM OF BORING 205'		

DATE STARTED: 9/2/09	GWL: DEPTH: 3.4'	DATE/TIME: 9/3/09 @ 0730	NOTES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
DATE COMPLETED: 9/8/09	GWL: DEPTH: 4.5'	DATE/TIME: 9/8/09 @ 0900	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			





LNP- OFFSET BORING PROGRAM

PROJECT NO. 07-3935

LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (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	USCS SYMBOL	REMARKS	
						DESCRIPTION			
36.7	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.	sp		
	4	S-3	5-3 3 (6)	1.0			sp		
	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		
	6	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 HCl.	sp-sc		
	10	S-8	W-W 1 (1)	0.4		10.5' As above except more dolomite.	sp-sc		
	30.7	12	S-9	1-3 5 (8)		1.1	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
	29.9	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 HCl, loose.		sp-sm
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer HELPER: Chad/Cody							
APPROVED BY:		RIG: Failing 1500							
DRILLING CO.: HUSS									

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (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	USCS SYMBOL	REMARKS
						DESCRIPTION		
27.2	16	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.
						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.		
22.7	20	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.	ml	Sample could also be classified as degraded dolomite. Driller notes: soft from 19.5-20'. Stopped coring at 20' and switched back to mud rotary and SPT sampling. NOTE: switched to NWJ rods for the remainder of drilling-Energy Testing attempted from 21.5-35.2'.
	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	
	24	S-14	46-34 50/6 (84)	1.2			ml	
	26	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 HCl, very dense.	ml	
16.0	26	S-16	28-50/3 (50)	0.5			ml	
	28	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 STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						
CHECKED BY: WDS		DRILLER: Eddie Palmer HELPER: Chad/Cody						
APPROVED BY:		RIG: Failing 1500						
DRILLING CO.: HUSS								

LNP- OFFSET BORING PROGRAM

LOG OF BORING NO. O-2

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 1722994.8 E 457937.7 SURFACE EL: 42.7	USCS SYMBOL	REMARKS
						DESCRIPTION		
	30	OB-3	0% (0%)	0		No recovery 30-31.5'.		
11.2	32	S-17	16-31 50/5 (81)	1.1		31.5-33.0' SANDY SILT with GRAVEL (ml), similar to 24.5'.	ml	
9.7						33.0-34.5' DOLOMITE, as above, except moderately weathered.		NOTE: 32.9-33.0' no sample.
8.2	34	OB-4	60% (0%)	0.9				
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 HCl, very dense.	ml	NOTE: Sample re-labeled to S-18-1.
	36	OB-5	93% (20%)	1.4		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		38.2-41.2' Vertical fracture.		
	40	OB-7	100% (0%)	1.8		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 HCl.		
	42	OB-8	64% (22%)	3.2				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 STARTED: 9/10/09				GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
DATE COMPLETED: 9/18/09				GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725		
FIELD GEOLOGIST: JLO				DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring				
CHECKED BY: WDS				DRILLER: Eddie Palmer HELPER: Chad/Cody				RIG: Failing 1500
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- OFFSET BORING PROGRAM

LOG OF BORING NO. O-2

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 1722994.8 E 457937.7 SURFACE EL: 42.7	USCS SYMBOL	REMARKS	
						DESCRIPTION			
44									
-2.3		S-18	20-50/5 (50)	0.8		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.	ml	NOTE: sample re-labeled S-18-2.	
-3.2	46					45.9-50.0' DOLOMITE above except moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2).		Water level on 9/12/09 @ 0715 5.2'. OB-9: Drilling Pressure: 250 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 5min 38sec Circulation loss: none Note: OB-9 sample put in soil jar due to very soft soil-like nature.	
	48	OB-9	20% (0%)	1.0					
-7.3	50	S-20	50/6 (50)	0.3		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.	ml	OB-10: Drilling Pressure: 150 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 10min 28sec Circulation loss: none Special care sample: 50.8-51.6'.	
-7.8						50.5-65.0' Degraded DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), very soft, poorly indurated, but mainly silt with gravel (as described above), strong reaction to 1N HCl, bedding not apparent.			
	52	OB-10	58% (0%)	2.9					
	54								
	56	S-21	43-50/3 (50)	0.5				OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec Circulation loss: none	
	58	OB-11	52% (0%)	2.6					
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									








LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	60	S-22	50/5 (50%)	0.3	[Pattern]			OB-12: Drilling Pressure: 150 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 8min 14sec Circulation loss: none OB-13: Drilling Pressure: 200 psi Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 10min 0sec Circulation loss: none OB-14: Drilling Pressure: 150-200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 10min 46sec Circulation loss: none 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.
	62	OB-12	34% (0%)	1.7	[Pattern]			
	64				[Pattern]			
	66	OB-13	68% (0%)	1.7	[Pattern]	65.0-67.5' DOLOMITE, severely 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 HCl.		
	68	OB-14	100% (20%)	2.5	[Pattern]	67.5-75.0' DOLOMITE, moderately hard, pitted/porous, vuggy, fossiliferous, moderately fractured, moderately weathered, pale yellowish brown (10YR 6/2), strong reaction to 1N HCl when powdered.		
	70				[Pattern]	As above except slightly to moderately fractured.		
	72	R-1	80% (38%)	4.0	[Pattern]			


DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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'
DRILLING CO.: HUSS	DRILLER: 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)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.7			DESCRIPTION
	74								
	76	R-2	90% (16%)	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, 77.5-78' harder, then soft.	
	78					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') 9min 8sec (82.5-85') Circulation Loss: none	
	82	R-3	80% (18%)	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).			
	84					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.			
	86	R-4	92% (12%)	4.6		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 thin 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 STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					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'	
DRILLING CO.: HUSS					DRILLER: 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)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.7			DESCRIPTION
	88								
	90								
	92	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'.	
	94	S-24	21-50/2 (50)	0.4		95-95.3' DOLOMITE as at 85'. 95.3-97.9' DOLOMITE, moderately hard, moderately weathered, thick 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%	
	96								
	98	R-6	100% (0%)	5.0		98.1-99.2' DOLOMITE, as at 95.3' except with some dolomite clasts.			
-56.5						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 Engine RPM: 1400 Drill Time: 17min 4sec (100-103.5') 14min 17sec (103.5-105') Circulation Loss: 100%	
	100								
-58.4						101.1-101.3' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish 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')			
	102								
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						RIG: Failing 1500	
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody					
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935
LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	104	R-7	96% (26%)	4.8		103.2-110' DOLOMITE, moderately hard, fresh to slightly weathered, weak reaction to 1N HCl when powdered, pitted/vuggy in thin bands/zones, fine grained to crystalline, fossiliferous, thick bedded, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4). Vertical fracture 103.2-105.0'.		Run-8: Drilling Pressure: 100-150 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 12min 10sec (105-107') 21min 40sec (107-110') Circulation Loss: 100%
	106	S-25	32-48 50/5 (98)	0.9				
	108	R-8	100% (30%)	5.0				
	110							
	112					110-120' DOLOMITE, very pale orange (10YR 8/2) to pale yellowish 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, few fossils.		Run-9: Drilling Pressure: 100 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 22min 20sec (110-113.2') 13min 7sec (113.2-115) Circulation Loss: 100%
	114	R-9	100% (10%)	5.0				
-71.6 -71.8						114.3-114.5' Grouted area in core.		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%
	116					116.6-118.3' Thin vertical fracture, closed from 117.5-118.3'.		

DATE STARTED: 9/10/09	GWL: DEPTH: 5.2'	DATE/TIME: 9/12/09 @ 0715	NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
DATE COMPLETED: 9/18/09	GWL: DEPTH: 4.3'	DATE/TIME: 9/19/09 @ 0725	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**

LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7		USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			
						DESCRIPTION			
	118	R-10	100% (40%)	5.0		118.6-119' As above except not as pitted.			Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 13min 38sec (120-121') Circulation Loss: 100% Driller notes soft at 121' Run-12: 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% Run-13: Drilling Pressure: 150-200 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 8min 22sec (130-132.5') 9min 16sec (132.5-135')
	120					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.			
	122	S-26	32-39 12 (51)	0.7		121' Start of fracture, black coating on surface-area becomes soft. 121-122.5' DOLOMITE, highly weathered, as above, black staining on some pieces, crushed/fracture zone. Horizontal fracture at 121.8'.			
-79.8						ROD DROP 122.5-123.7'.			
-81.0		R-11	40% (16%)	2.0					
-81.3	124					123.7-124.0' DOLOMITE as above.			
						ROD DROP 124.0-125.0'.			
-82.3		S-27	2-3 17 (20)	0.6		125-127.5' Rubble (see remarks column).		125-126' clean out of rubble/ disturbance caused by split spoon sampling.	
	126								
	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'.			
	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.			
-88.3						ROD DROP 131.0-131.5'.			
-88.8									

DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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'
DRILLING CO.: HUSS	DRILLER: 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)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS		
						SURFACE EL: 42.7			DESCRIPTION	
	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, fresh. 133.5-135' DOLOMITE, as at 131.5-133.0' except moderately to intensely weathered.		Circulation Loss: 100%		
	134					135-136' Rubble from split spoon disturbance above.			Run-14: Drilling Pressure: 250 psi Kelly Bar RPM: 194 Engine RPM: 1200 Drill Time: 8min 57sec (135-137') 14min 38sec (137-139') 4min 51sec (139-140') Circulation Loss: 100%	
	136	S-28	4-50/5 (50)	0.3		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 HCl.				
	138	R-14	100% (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.				
-96.3						139-140' LIMESTONE rubble, intensely fractured (some pieces).				
-97.3	140					140-141.6' DOLOMITE, very pale orange (10YR 8/2) to pale yellowish 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 Drill Time: 26min 57sec (140-141') 28min 8sec (141-143') 16min 42sec (143-145') Circulation Loss: 100%	
	142	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 HCl 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.			Run-16: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 47min 4 sec	
	144									
	146									
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'				
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725						
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring								
CHECKED BY: WDS		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500		
APPROVED BY:										
DRILLING CO.: HUSS										

LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (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	USCS SYMBOL	REMARKS	
						DESCRIPTION			
	148	R-16	100% (86%)	5.0	[Pattern]	146.2-149' As above except fresh to slightly weathered. 146.9' Horizontal fracture (crushed rock zone infilling). 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 medium light gray (N6), moderately hard, moderately weathered, pitted/porous/vuggy in thin bands, moderately fractured, fossiliferous, strong reaction to 1N HCl when powdered, thick bedded.		Circulation loss: 100% Run-17: Drilling Pressure: 150 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 44min 5sec (150-152.5') 44min 25sec (152.5-155') Circulation loss: 100%	
	152	R-17	100% (32%)	5.0	[Pattern]	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. 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).		Run-18: Drilling Pressure: 150-200-150 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 13sec Circulation loss: 100%	
-114.6	158	R-18	100% (20%)	5.0	[Pattern]	157-160' Alternating beds of moderately weathered porous/vuggy dolomite and crystalline dolomite as described above, moderately fractured (thin, closed). 157.3-163.5' Grout-sidewall of adjacent A-series boring.		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300	
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						RIG: Failing 1500	
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody					
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935




LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.7			DESCRIPTION
-120.8	162	R-19	100% (42%)	5.0	[REDACTED]			Drill Time: 44min 46sec Circulation loss: 100% First 0.3' of Run-19 from the end of R-18.	
	164				[REDACTED]				
	166	R-20	100% (0%)	5.0	[REDACTED]			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				[REDACTED]			Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 40min 48sec Circulation Loss: 100%	
	172	R-21	100% (18%)	5.0	[REDACTED]				
	174				[REDACTED]			Run-22: Drilling Pressure: 200-250 psi	
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									





NLP- OFFSET BORING PROGRAM

PROJECT NO. 07-3935

LOG OF BORING NO. O-2

ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			DESCRIPTION
176		R-22	100%	5.0		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.		Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 37min 24sec Circulation Loss: 100% Driller notes: soft 176-177' and 178-179'.
178	(0%)		178.5-178.8' DOLOMITE as at 176.1'. 178.8-180' DOLOMITE as at 170'.					
180		R-23	100%	5.0		180-181.1' DOLOMITE, moderately hard, pale yellowish brown (10YR 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 orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), pitted/porous, sandy texture, moderately to severely 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'.		Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 41min 54sec Circulation Loss: 100% Driller notes: 181-182.5' very soft.
182	(46%)		184.1-185' DOLOMITE, similar to 182.7' except moderately fractured (all horizontal). 185-186.2' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sandy texture in weathered areas, thick bedded, strong reaction to 1N HCl when powdered. 186.2-187' Crystalline DOLOMITE, moderately hard, fresh, moderately fractured, light gray (N7) to light olive gray (5Y 6/1), strong reaction to 1N HCl when dry/powdered. 187-187.8' DOLOMITE as at 185'.					
184		R-24	100%	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. 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 HCl when powdered, vertical fracture from 190-191.1'.		Run-24: Drilling Pressure: 200 psi Kelly Bar RPM: 224 Engine RPM: 1400-1500 Drill Time: 33min 13sec Circulation Loss: 100%
186	(46%)		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. 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 HCl when powdered, vertical fracture from 190-191.1'.					
188								Run-25:
190								
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								




LNP- OFFSET BORING PROGRAM **PROJECT NO. 07-3935**
LOG OF BORING NO. O-2





ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.7			DESCRIPTION
	192	R-25	100% (18%)	5.0		191.9-192.2' Crystalline DOLOMITE, moderately to intensely weathered as at 186.2'.		Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 26min 9sec Circulation Loss: 100%	
	194		192.2-194.2' DOLOMITE, moderately hard, strong reaction to 1N HCl 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	R-26	92% (28%)	4.6		194.2-195' DOLOMITE as at 188.8'.		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.	
	196		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 HCl when powdered.						
	198		197.6-198.7' Transition zone, thin alternating layers of dolomite as above and crystalline dolomite, moderately fractured.						
	200	R-27	100% (68%)	5.0		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 HCl when dry/ powdered.		Run-27: Drilling Pressure: 200 psi Kelly Bar RPM: 234 Engine RPM: 1500 Drill Time: 23min 23sec Circulation Loss: 100%	
	202		200-202.4' As above except slightly to moderately weathered, few very thin pitted bands, vertical fracture from 200-201.3'.						
	204					202.4-205' DOLOMITE, very light gray (N8) to medium light gray (N6) on outside of core, light olive gray (5Y 6/1) on fresh sample, moderate yellowish brown (10YR 5/4) when weathered, moderately weathered, fossiliferous, pitted/porous, vuggy, sandy texture, with clasts of crystalline dolomite throughout, moderately soft to soft, weak reaction to 1N HCl when broken, unfractured by moderately to poorly indurated (conglomerate-like appearance) bedding no apparent.			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					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'	
DRILLING CO.: HUSS					DRILLER: 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)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7	USCS SYMBOL	REMARKS
						SURFACE EL: 42.7			DESCRIPTION
	206	R-28	92% (36%)	4.6		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'.		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.
	208					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.		
	210					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).		
	212	R-29	94% (18%)	4.7		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.		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%
	214					212-213' As above except more crystalline dolomite clasts (80-90%) and less weathered dolomite "matrix" (10-20%). 213-215' DOLOMITE, very light gray (N8) on outside of core, grayish orange (10YR 7/4), moderately hard, moderately weathered, slightly to moderately fractured, vuggy, weak reaction to 1N HCl when powdered, some fossils, thick bedded.		
	216	R-30	96% (44%)	4.8		215-216.6' DOLOMITE, moderately soft to moderately hard, light gray (N7) with very thin pale yellowish brown (10YR 6/2) bands, fresh to slightly weathered, thick bedded, few vugs (weathered out fossils), strong reaction to 1N HCl when powdered.		Run-30: Drilling Pressure: 350-400 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 18min 5sec Circulation Loss: 100%
	218					216.6-217' DOLOMITE, moderately hard, moderately weathered, fossiliferous, vuggy, pitted, light gray (N7). 217-217.8' DOLOMITE, moderately soft, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous in bands, weak reaction to 1N HCl when powdered, sandy texture, friable. 217.8-218.6' DOLOMITE, intensely fractured/crushed zone.		
						218.6-220' DOLOMITE as at 216.6'.		
DATE STARTED: 9/10/09		GWL: DEPTH: 5.2'		DATE/TIME: 9/12/09 @ 0715		NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
DATE COMPLETED: 9/18/09		GWL: DEPTH: 4.3'		DATE/TIME: 9/19/09 @ 0725				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- OFFSET BORING PROGRAM						LOG OF BORING NO. O-2		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 1722994.8 E 457937.7 SURFACE EL: 42.7		USCS SYMBOL	REMARKS
						DESCRIPTION			
-182.3	220	R-31	100% (46%)	5.0		220-221.7' DOLOMITE, moderately soft, moderately to severely 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 4.3'.
	222					221.7-222.3' DOLOMITE, as above except hard, slightly weathered.			
	224					222.3-224' DOLOMITE, soft, severely weathered, grayish orange (10YR 7/4), fossiliferous, area slightly washed out but still intact.			
	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 STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:				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'	
DRILLING CO.: HUSS				DRILLER: 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	USCS SYMBOL	REMARKS
						DESCRIPTION		
	0				0.0-10.0' Sandy CLAY.		cl	0-15' Destructive drilling, log based on drill cuttings.
	1.5							
	3							
	4.5							
	6							
	7.5							
	9							
32.5						10.0'	sp	
	10.5				10.0-15.0' SAND.			

DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring	NOTES: NA
DRILLING CO.: HUSS	DRILLER: 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9		USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			
						DESCRIPTION			
27.5	12				[Dotted Pattern]				
	13.5								
	15				[Horizontal Line]	15'-			
	16.5	OB-1	80% (40%)	2.8	[Cross-hatch Pattern]	<p>TOP OF AVON PARK FORMATION</p> <p>15.0-18.5' DOLOMITE, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), moderately soft, strong reaction to 1N HCl when powdered, slightly weathered, unfractured, thick bedded, slightly pitted.</p> <p>16.4-17' Becomes moderately to intensely weathered, intensely fractured, fossiliferous.</p> <p>17-18.5' Slightly weathered, slightly fractured.</p>		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'.	
	18								
	19.5	OB-2	100% (100%)	1.5	[Cross-hatch Pattern]	<p>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 at 19.5', strong reaction to 1N HCl when powdered.</p>			
	21					<p>21.3-30.9' DOLOMITE, severely weathered to degraded, soft to very soft, poorly indurated silt (gritty texture) with dolomite grains (coarse grain size), strong reaction to 1N HCl when powdered, dark yellowish</p>			

DATE STARTED: 9/21/09	GWL: DEPTH: 4.6'	DATE/TIME: 9/22/09 @ 0715	NOTES: NA
DATE COMPLETED: 10/1/09	GWL: DEPTH: 6.3'	DATE/TIME: 10/1/09 @ 0720	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	USCS SYMBOL	REMARKS	
						DESCRIPTION			
	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.		Driller notes: OB-4, whole run soft drilling.	
	24								
	25.5					26.2-27' Becomes moderately to intensely fractured.			
	27	OB-4	60% (16%)	3.0					
	28.5								
	30								
	31.5					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					
DATE STARTED: 9/21/09					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715			NOTES: NA	
DATE COMPLETED: 10/1/09					GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring				
CHECKED BY: WDS									
APPROVED BY:					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
4.1	33	OB-6	78% (46%)	3.9		35.0-37.7' As above except slightly fractured (horizontal-along bedding planes).		Driller notes: 38.5-40' soft drilling.
	34.5				37.7-38.4' As above except moderately to intensely fractured.			
	36				38.4-43.2' SILT with GRAVEL (DEGRADED DOLOMITE), 50% silt, 50% gravel, nonplastic, no dry strength, gravel is very soft, slow to no dilatancy, low toughness, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), weak reaction to 1N HCl, poorly indurated.			
	37.5	OB-7	43% (32%)	2.0		43.2-44.7' DOLOMITE, moderately hard, pitted/porous, moderately weathered, unfractured, thick bedded, fossiliferous, pale yellowish brown (10YR 6/2).		
	39							
	40.5							
	42							
-0.7	43.5							




DATE STARTED: 9/21/09	GWL: DEPTH: 4.6'	DATE/TIME: 9/22/09 @ 0715	NOTES: NA
DATE COMPLETED: 10/1/09	GWL: DEPTH: 6.3'	DATE/TIME: 10/1/09 @ 0720	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS	
						DESCRIPTION			
45		OB-8	91% (40%)	4.8		44.7-50' Same as above except 45.3-47.6' moderately to severely weathered, moderately to intensely fractured.		Water level on 9/22/09 @ 0715 4.6'.	
46.5									
48									
49.5		OB-9	84% (36%)	4.2		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						51.2-51.7' DOLOMITE, intensely weathered/degraded, soft to very soft, friable, moderate yellowish brown (10YR 5/4), sandy/silty texture.			
52.5						51.7-57' DOLOMITE, moderately soft, thick bedded, vuggy, sandy texture, weathering in horizontal layers, moderate yellowish brown (10YR 5/4), moderately to poorly indurated, with very thin organic layers, moderately fractured (bedding planes).			
54									
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA	
DRILLING CO.: HUSS					DRILLER: 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	USCS SYMBOL	REMARKS	
						DESCRIPTION			
	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.			
	58.5							OB-12: Drilling Pressure: 150-200 psi Kelly Bar RPM: 224 Engine RPM: 1400-1500	
	60								
	61.5	OB-11	68% (38%)	3.4		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								
	64.5								
DATE STARTED: 9/21/09					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715			NOTES: NA	
DATE COMPLETED: 10/1/09					GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring			RIG: Failing 1500	
CHECKED BY: WDS					DRILLER: Eddie Palmer HELPER: Chad/Cody				
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program PROJECT NO. 07-3935




LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	66	OB-12	68% (56%)	1.7				Drill Time: 8min 23sec Circ. Loss: none Driller notes: 65-66.5' soft then hard.
	67.5							
	69	OB-13	100% (32%)	2.5				OB-13: Drilling Pressure: 150 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 22min 42sec Circ. Loss: none
	70.5							
	72	R-1	66% (24%)	3.3				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'.
	73.5							
	75							
	76.5							
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-3




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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	78	R-2	98% (82%)	4.9				
	79.5					79.3-79.4' Few very thin black organic layers, becomes slightly to moderately weathered, sandy texture.		
	81					80-80.8' Rubble zone (dolomite as above). 80.8-81.2' As above except moderately to intensely fractured.		R-3: Drilling Pressure: 150 psi Kelly Bar RPM: 226 Engine RPM: 1400-1500 Drill Time: 18min 45sec Circ. Loss: none
	82.5	R-3	76% (0%)	3.8		81.2-81.6' Intensely fractured to crushed. 81.6-85' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), 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).		
	84							
	85.5					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.		
	87	R-4	84% (54%)	4.2		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-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).
						87.5' Becomes more pitted/porous and vuggy, few very thin organic		
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring				RIG: Failing 1500		
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody				
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-3





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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.5			DESCRIPTION
	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 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.	
	91.5					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.			
	93	R-5	100% (24%)	5.0		92.3-92.4' Severly weathered. degraded DOLOMITE, very soft, friable.			
	93					92.4-92.7' Crystalline DOLOMITE as above.			
	94.5					92.7-95' DOLOMITE, as at 86-90' except with very pale orange (10YR 8/2) dolomite clasts, moderately fractured (45° breaks).			
	94.5					95-95.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) 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.		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') Circ. Loss: none Water level 9/28/09 @ 0740 5.7'	
	96					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.			
	97.5	R-6	100% (0%)	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, sandy texture, moderately to intensely fractured (few rubble zones), few vugs, thick bedded.			
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA	
DRILLING CO.: HUSS					DRILLER: 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9	USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			DESCRIPTION
99								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
100.5		R-7	76% (14%)	3.8	102-105' DOLOMITE, same as above except moderately fractured, moderately weathered, sandy texture.			
102								
103.5					105-106.6' DOLOMITE as above except soft, breaks easily.			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%
105		R-8	100% (0%)	5.0	106.6-110' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, strong reaction to 1N HCl when powdered, few fossils, thick bedded, moderately fractured-vertical fracture 106.1-108.4', open-rough, slightly to moderately weathered.			
106.5								
108								
109.5								
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA RIG: Failing 1500
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			

LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	111					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', weak reaction to 1N HCl when powdered, moderately fractured (bedding planes).		
	114							
	115.5					115-118.1' DOLOMITE, soft to very soft, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), severely weathered to degraded, friable, moderately to poorly indurated, sandy texture, vuggy, porous/pitted, fossiliferous, moderately to intensely fractured (mostly along bedding planes).		R-10: Drilling Pressure: 100-150 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 4min 42sec (115-117.5') 12min 52sec (117.5-120') Circ. Loss: 10%
	117	R-10	70% (10%)	3.5				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'
	118.5							
	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.		
	118.5					118.8-120' DOLOMITE, severely 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					120-125' DOLOMITE, pale yellowish brown (10YR 6/2), moderately 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.		R-11: Drilling Pressure: 150 psi Kelly Bar RPM: 227 Engine RPM: 1400-1500
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-3

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			
						DESCRIPTION			
	121.5	R-11	100% (42%)	5.0		123.4-123.6' Becomes intensely fractured/crushed.			Drill Time: 9min 4sec (120-122') 6min 41sec (122-125') Circ. Loss: 10%
	123								
	124.5	R-12	86% (32%)	4.3		125-128' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, thick bedded, slightly weathered, pitted/porous, fossiliferous, vuggy, weak to moderate reaction to 1N HCl when powdered, slightly fractured (bedding planes).		R-12: 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-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'	
	126					126-126.3' Larger vugs (0.05' thick) oblong shaped.			
	127.5								
	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								
DATE STARTED: 9/21/09						GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715	
DATE COMPLETED: 10/1/09						GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720	
FIELD GEOLOGIST: JLO						DRILLING METHOD: Mud Rotary/PQ3 Coring			
CHECKED BY: WDS									
APPROVED BY:						DRILLER: Eddie Palmer		HELPER: Chad/Cody	
DRILLING CO.: HUSS						RIG: Failing 1500			

LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			DESCRIPTION
132		R-13	94% (8%)	4.7		reaction to 1N HCl when powdered, thick bedded, pitted in very thin 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'.		
133.5						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') 10min 29sec (136.6-136.8') 29min 38sec (136.8-140') Circ. Loss: 100%
135						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).		
136.5		R-14	92% (20%)	4.6		139.3-140' Intensely fractured.		
138						140-144' Crystalline DOLOMITE, with few thin interbeds of pitted dolomite, pale yellowish brown (10YR 6/2), moderately hard, no fossils, fresh, moderately to intensely 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)
139.5								
141								
142.5		R-15	70%	3.5				
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935




LOG OF BORING NO. O-3

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			
						DESCRIPTION			
	144		(14%)			144-145' DOLOMITE, dark yellowish orange (10YR 6/6), soft, fossiliferous (packstone-like), sandy texture.			
	145.5	ST-2	100% (NA%)	1.2		DOLOMITE, as above (144-145') except poorly cemented/indurated, harder piece at bottom of Shelby tube.			Shelby Tube ST-2: 145-146.2' Down Pressure: 900 psi Pushed: 14 inches Recovery: 1.2'
	147					146.2-150' DOLOMITE as at 144-145' except moderately to fractured (bedding planes).			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%
	148.5	R-16	100% (29%)	3.8		147.2-148.0' Crushed zone. 148.4-150.0' Unfractured (1 horizontal break at 149.7').			
	150					150-150.7' DOLOMITE, moderately hard, strong reaction to 1N HCl, medium light gray (N6) to light olive gray (5Y 6/1), slightly to moderately weathered, porous/pitted, vuggy, sandy texture in vugs filled with weathered dolomite, slightly fractured.			R-17: Drilling Pressure: 150-200, 300-350 psi Kelly Bar RPM: 215, 210 Engine RPM: 1300-1400, 1300 Drill Time: 10min 3sec (150-152.1') 9min 34sec (152.1-155') AIRLIFT Circ. Loss: 100% NOTE: Run-17A and R-17B equal R-17.
	151.5	R-17A	86% (43%)	1.8		150.6-151.2' Vertical fracture. 150.7-155' DOLOMITE, moderately hard, pale yellowish brown (10YR 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.			
	153		90%			152.1-152.5' Becomes moderately soft. 153.8-154.2' Vertical fracture.			Water level 9/30/09 @ 0725 5.3'.
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA			
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			DESCRIPTION
154.5		R-17B	(62%)	2.6				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%
156					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 HCl when powdered, unfractured except horizontal 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 HCl when powdered, thin to moderate bedding, unfractured except vertical fracture from 155.9-157'. 156.1-160.0' DOLOMITE as at 155-155.7'.			
157.5		R-18	88% (20%)	4.4				
159								R-19: 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
-118.0	160.5				160-160.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 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.			
-119.0					160.5-161.5' ROD DROP.			
162					161.5-162.8' DOLOMITE, as above except with few very thin layers/pockets of crystalline dolomite.			
-120.0		R-19	50% (38%)	2.5				
-120.5					162.5-163.0' ROD DROP.			
163.5					163.3-163.7' DOLOMITE as at 161.5-162.8'. 163.7-165' Washed out zone (piece of core wedged in core barrel shoe.)			
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			DESCRIPTION
	165					165-165.7' Rubble, cave-in from above.		R-20: Drilling Pressure: 150-200 psi Kelly Bar RPM: 201 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 core catcher.
-124.2	166.5	R-20	48% (22%)	2.4		165.7-166.7' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, sandy texture, vuggy, medium bedded, moderately fractured.		
	168					166.7-168' ROD DROP.		
-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.		
	169.5					170-173.4' DOLOMITE, moderately hard, pale yellowish brown (10YR 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').		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%
	171					173.4-175' DOLOMITE, moderately soft to moderately hard, slightly to moderately weathered, sandy texture, no fossils, no pits or vugs, strong reaction to 1N HCl when powdered, thick bedded, dense, unfractured.		
	172.5	R-21	94% (48%)	4.7		175-175.7' DOLOMITE, moderately hard, pale yellowish brown (10YR 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
	174							
	175.5							
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			








LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						DESCRIPTION		
	177	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.		Engine RPM: 1300-1400 Drill Time: 31min 31sec Circ. Loss: 100%
	178.5							
	180					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'.
	181.5							
	183	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.		
	184.5							
	186					185-187' DOLOMITE, moderately hard, light gray (N7) to light olive gray (5Y 6/1), medium to thin bedded, fresh to slightly weathered, slightly to moderately fractured (all breaks horizontal), slightly pitted in very thin bands, sandy texture, moderate to strong reaction to 1N HCl. 186.2-186.3' thinly laminated.		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 trying to retrieve core run.
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA		
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

NLP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. O-3

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			
						DESCRIPTION			
187.5		R-24	90% (40%)	4.5		187-187.4' Moderately to severely 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 thin bands, few vugs, no fossils, slightly fractured (horizontal), banded appearance-laminated.			Water level on 10/1/09 @ 0720 6.3'. 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%
190.5		R-25	100% (14%)	5.0		192.8-194.3' Crystalline DOLOMITE as at 190' except moderately to intensely fractured.			
192						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.			
193.5						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%
195									
196.5			100%						
DATE STARTED: 9/21/09		GWL: DEPTH: 4.6'		DATE/TIME: 9/22/09 @ 0715		NOTES: NA			
DATE COMPLETED: 10/1/09		GWL: DEPTH: 6.3'		DATE/TIME: 10/1/09 @ 0720					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring							
CHECKED BY: WDS									
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
DRILLING CO.: HUSS									

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-3

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.5			DESCRIPTION
	198	R-26	(28%)	5.0				
	199.5					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.		R-27: Drilling Pressure: 200-300 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 48min 33sec Circ. Loss: 100%
	201					200-201.6' DOLOMITE, moderately hard, yellowish gray (5Y 7/2) and 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.		
	202.5	R-27	100% (42%)	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						BOTTOM OF BORING 205'		
	205.5							
	207							
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-4

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
						DESCRIPTION		
41.9	0	S-1	7-12 10 (22)	1.0		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 HCl, medium dense.	sm	
	1.5					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.	sp	
	3	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 HCl, medium dense.	sp	
	4.5					3.0-5.0' As above except dark yellowish orange (10YR 6/6) to grayish orange (10YR 7/4), medium dense.		
	5.0	S-3	6-10 11 (21)	1.0		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	
37.3	6					6.0-7.5' Same as 3.0-5.0' except loose.	sp	
	7.5	S-4	4-4 2 (6)	0.7		7.5-7.8' Same as above.	sp	
	8.1					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 HCl, loose.		
	9	S-5	4-4 3 (7)	1.0		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	
36.3	10.5					9.0-10.5' Same as 7.8-8.1'.	sp	
	10.5	S-6	3-3 4 (7)	1.1		10.5-11' Same as 8.1-9.0'.	ch	
34.2						10.5-11' Same as 8.1-9.0'.	ch	
		S-7	3-3 5 (8)	0.9		10.5-11' Same as 8.1-9.0'.	ch	
33.3						10.5-11' Same as 8.1-9.0'.	ch	
31.8								

DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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	NOTES: Used NWJ for SPT sampling.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-4




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	
						DESCRIPTION			
31.3		S-8	6-10 9 (19)	1.0	[Profile: Dotted pattern]	11-12.0' Same as 9.0-10.5'	sp		
	12	S-9	6-7 9 (16)	0.9	[Profile: Dotted pattern]	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 reaction to 1N HCl, medium dense.	sp		
28.8	13.5	S-10	3-4 5 (9)	0.5	[Profile: Vertical lines]	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 HCl, loose.	sm		
27.3	15	S-11	5-6 6 (12)	0.9	[Profile: Dotted pattern]	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	[Profile: Dotted pattern]	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	S-13	3-3 3 (6)	1.1	[Profile: Dotted pattern]	18.0-19.5' Same as above.	sp-sm		
	19.5	S-14	2-3 2 (5)	1.4	[Profile: Dotted pattern]	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.	sp-sm		
	21	S-15	2-1 2 (3)	1.5	[Profile: Dotted pattern]	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		
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					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			NOTES: Used NWJ for SPT sampling.	
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	

LNP- Offset Boring Program PROJECT NO. 07-3935








LOG OF BORING NO. O-4

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	
						DESCRIPTION			
19.8	22.5	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.	ml		
	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 appearance, very thin calcereous layers.	ml		
15.2	27	S-19	9-23 27 (50)	0.9		SILT (ml), as above except hard, strong reaction to 1N HCl. 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 HCl.	ml gp-gm		
	28.5	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 STARTED: 10/6/09					GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745			NOTES: Used NWJ for SPT sampling.	
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	
DRILLING CO.: HUSS									

LOG OF BORING NO. O-4



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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.3			DESCRIPTION
33		OB-1	34% (0%)	1.2					
34.5									
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.		OB-2: 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					
39									
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.		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'.	
42						41.2-41.7' Moderately fractured. 41.7-42.5' Vertical fracture.			
43.5		OB-3	76% (20%)	3.8					
						42.7-45' DOLOMITE, moderately soft to soft, moderately to severely 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: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.			
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			
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-4

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
						DESCRIPTION		
	45					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'.		OB-4: Drilling Pressure: 200 psi Kelly Bar RPM: 215 Enginer RPM: 1300-1400 Drill Time: 10min 35sec Circ. Loss: none
	46.5	OB-4	76% (24%)	3.8		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 HCl. 47.2-48.2' Same as 45-46.4' except with very thin organic layers/laminations.		
	48					48.2-50' As above except moderately soft.		
	49.5					50-55' DOLOMITE, alternating layers of soft to very soft moderate yellowish brown (10YR 5/4), moderately to severely weathered, poorly indurated, bedding structure not evident, slightly to moderately fractured (in zones), weak to moderate reaction to 1N HCl, pitted/porous, sandy texture.		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'.
	51							
	52.5	OB-5	98% (28%)	4.9				
	54							

DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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	NOTES: Used NWJ for SPT sampling.
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-4

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
						DESCRIPTION		
	55.5	OB-6	78% (38%)	3.9		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-7	98% (50%)	4.9		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
	60							
	61.5							
	63							
	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 STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:		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		NOTES: Used NWJ for SPT sampling.				
DRILLING CO.: HUSS		DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500				




LNP- Offset Boring Program

LOG OF BORING NO. O-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		USCS SYMBOL	REMARKS		
						SURFACE EL: 42.3					
						DESCRIPTION					
	66					pale yellowish brown (10YR 6/2).			Drill Time: 38min 38sec Circ. Loss: none Run-2: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Enginer RPM: 1200-1300 Drill Time: 30min 40sec Circ. Loss: none		
	67.5	R-1	100% (44%)	5.0		67-68' As above except unfractured.					
	69					68-74.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) 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 HCl, slightly to moderately fractured (bedding planes).					
	70.5										
	72	R-2	98% (76%)	4.9							
	73.5										
	75					74.5-75' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately weathered, 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.			Run-3: Drilling Pressure: 150 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 15min 22sec Circ. Loss: none		
	76.5					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.					
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:				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				NOTES: Used NWJ for SPT sampling.			
DRILLING CO.: HUSS				DRILLER: Eddie Palmer HELPER: Chad/Cody				RIG: Failing 1500			

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-4

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
						DESCRIPTION		
	78	R-3	78% (0%)	3.9		77.5-80' As above except intensely fractured/rubble (not cave-in), fossiliferous.		
	79.5					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 HCl 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-not a void.
	81					80.7-81.2' DOLOMITE, very light gray (N8) to light gray (N7), moderately hard to hard, moderately to severely weathered, vuggy, pitted in bands, intensely fractured, strong reaction to 1N HCl.		
	82.5	R-4	38% (0%)	1.9		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 HCl when powdered.		
	84							
	85.5	ST-1	100% (NA%)	0.5		85-85.6' DEGRADED DOLOMITE (SILT (ml)), no plasticity, low dry strength, no dilatancy, low toughness, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), with very thin organic layers throughout.		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
	87		100%			85.6-90' DOLOMITE, moderately soft to soft, pale yellowish brown (10YR 6/2), moderately to severely weathered, friable, pitted/porous, vuggy, moderate to strong reaction to 1N HCl when powdered, moderately to intensely fractured.		
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					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			NOTES: Used NWJ for SPT sampling. RIG: Failing 1500
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			












LNP- Offset Boring Program **PROJECT NO. 07-3935**

LOG OF BORING NO. O-4

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	
						DESCRIPTION			
	88.5	R-5	(13%)	4.5					
	90					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 HCl, thick bedded, slightly fractured.		Run-6: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 26min 6sec Circ. Loss: none	
	91.5					90.7-91.6' As above except intensely fractured/rubble, moderately weathered.			
	91.5					91.6-95' DOLOMITE, as at 90' except fresh to slightly weathered, few vugs, slightly fractured (horizontal break at 93.6').			
	93	R-6	100% (54%)	5.0					
	94.5					Vertical fracture 94.1-95'.			
	96					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), unfractured, thick bedded.		Run-7: Drilling Pressure: 250-300, 200 psi Kelly Bar RPM: 210 Enginer RPM: 1300-1400 Drill Time: 10min 41sec (95-98') 1.2' recovery 22min 15sec (98-100') Circ. Loss: none Water level 10/8/09 @ 0745 6.5'	
	96					96.2' Becomes moderately to intensely fractured (possible washout zone 96.2-98')			
	96					96.2-98' Crushed/rubble with silt, dark yellowish brown (10YR 4/2).			
	97.5	R-7	76% (44%)	3.8					
	97.5					98-98.8' 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).			
DATE STARTED: 10/6/09					GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745			NOTES: Used NWJ for SPT sampling.	
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					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									









LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-4

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.3			
						DESCRIPTION			
	99					98.8-101' As above except with very pale orange (10YR 8/2) dolomite clasts (0.01-0.1' round), vuggy.			
	100.5	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.			Run-8: Drilling Pressure: 100-150 psi Kelly Bar RPM: 221 Engineer 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'.
-59.7	102					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.			
						102' Grout-coincides with rod drop noted by driller.			
						102-103' Drill cuttings, bentonite chips (from adjacent A-series boring)			Shelby Tube ST-2: Pushed: 2 feet Pressure: 150 psi
	103.5	ST-2	0% (0%)	0.0		103.5-105' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered.			Run-9: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Engineer 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
	105					105-108.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered.			
	106.5	R-9	66% (8%)	3.3		106.5-108' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered.			
	108					108-108.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered.			
	108.5					108.5-109.7' Rubble (driller does not think it is cave-in).			
	109.5					109.5-109.7' Rubble (driller does not think it is cave-in).			
DATE STARTED: 10/6/09					GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.
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					DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program PROJECT NO. 07-3935




LOG OF BORING NO. O-4

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.3			DESCRIPTION
						109.7-110' DOLOMITE as at 101-101.3'.		Run-10: Drilling Pressure: 150 psi Kelly Bar RPM: 217 Engineer RPM: 1300-1400 Drill Time: 24min 33sec Circ. Loss: 100% 0.5' Rubble
	111					110-115' DOLOMITE, moderately hard, pitted/porous, pale yellowish brown (10YR 6/2), slightly weathered, slightly to moderately fractured, few vugs, thick bedded, weak reaction to 1N HCl when powdered, few fossils.		
	112.5	R-10	86% (48%)	4.3		111.5-113.3' Vertical fracture.		
	114							Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 206 Engineer RPM: 1200-1300 Drill Time: 26min 14sec Circ. Loss: 100% 0.3' Rubble
	115.5					115-120' DOLOMITE, as above except slightly fractured (bedding planes).		
	117							
	118.5	R-11	100% (82%)	5.0				Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Engineer RPM: 1300
	120					120-121.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted/porous, moderately fractured-vertical fracture 120.4-122.0' open, rough, black coating on surface, strong reaction to 1N HCl when powdered.		
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:						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			NOTES: Used NWJ for SPT sampling.
DRILLING CO.: HUSS						DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500

LNP- Offset Boring Program

LOG OF BORING NO. O-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
						DESCRIPTION		
121.5		R-12	56% (22%)	2.8		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 when dry/powdered. 122-125' DOLOMITE, moderately hard, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sandy texture, unfractured, thin to medium bedded.		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								
124.5		ST-3	80% (0%)	1.0		Same as above except crushed.		Shelby Tube ST-3: Pushed: 15" Pressure: 1000 psi Sample bagged Water level 10/9/09 @ 0755 5.3'
126								
127.5		R-13	81% (46%)	3.0		126.3-128' DOLOMITE, moderately hard, weak reaction to 1N HCl when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), pitted/porous, sandy texture, vuggy, some fossils, slightly to moderately fractured (all horizontal), with pockets of crystalline dolomite. 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).		Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 17min 1sec Circ. Loss: 100% 1.7' rubble
129								
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				GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.
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				DRILLER: Eddie Palmer		HELPER: Chad/Cody		
APPROVED BY:				RIG: Failing 1500				
DRILLING CO.: HUSS								

LNP- Offset Boring Program

LOG OF BORING NO. O-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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.3			DESCRIPTION
132		R-14	74% (48%)	3.7		132-132.7' Vertical fracture, moderately to intensely fractured area.		
133.5								
-92.2		R-15	54% (30%)	2.7		134.5' Becomes fossiliferous.		Run-15: Drilling Pressure: 150-200 psi Kelly Bar RPM: 218 Engine RPM: 1300-1400 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).
135						134.5-135.6' ROD DROP.		
-93.3						135.6-137' DOLOMITE, moderately soft to moderately hard, grayish 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').		
136.5						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/ powdered, fresh, no fossils, pitted in very thin bands, medium to thick bedded.		
138		R-16	42%	2.1		139-139.7' DOLOMITE, light olive gray (5Y 6/1), moderately hard, medium to thick bedded, slightly weathered, pitted in very thin bands, unfractured, moderate to strong reaction to 1N HCl when powdered.		Run-16: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 2min 47sec (140-142') 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'
139.5						139.7-140' ROD DROP.		
-97.4						140-140.3' DOLOMITE, moderately to severely 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 fractured.		
-97.7						140.3-141' ROD DROP.		
-98.0						141-141.7' DOLOMITE, as above except moderately weathered, vuggy.		
-98.7	141					141.7-142.6' Banded/laminated appearance.		
142.5								

DATE STARTED: 10/6/09
DATE COMPLETED: 10/12/09
FIELD GEOLOGIST: JLO
CHECKED BY: WDS
APPROVED BY:

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

NOTES: Used NWJ for SPT sampling.

DRILLER: Eddie Palmer HELPER: Chad/Cody










RIG: Failing 1500

DRILLING CO.: HUSS









LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. O-4

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	
						DESCRIPTION			
-100.7	144	R-17	(26%)	2.8		142.6-142.8' Crystalline DOLOMITE as at 137-139'. 143-144.5' ROD DROP. 143'		Run-17: Drilling Pressure: 150-200 psi Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 20min 22sec (145-147') 0.6' recovery 26min 26sec (147-150') Circ. Loss: 100% Driller Notes: Rod drop at approximately 145.5' (2") Rod drop 147.5-148' Water Level 10/10/09 @ 0800 6.3'	
-102.2	144.5				144.5-145' DOLOMITE as at 141' except with pockets of crystalline 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). 145.5-145.7' ROD DROP. 145.5'				
-103.2 -103.4	147				145.7' Becomes thinly bedded/laminated appearance, elongated vugs (weathered out fossils), moderately weathered, hard, moderate to strong reaction to 1N HCl when powdered, unfractured.				
-105.2	147.5				147.2-147.5' DOLOMITE, moderately hard, laminated appearance, yellowish gray (5Y 7/2) and pale yellowish brown (10YR 6/2), fresh to slightly weathered, thick bedded, few vugs, strong reaction to 1N HCl when powdered, unfractured.				
-105.7	148.5				147.5-148' ROD DROP. 147.5'				
	148.5	R-18	56% (12%)	4.3		148-148.6' DOLOMITE, as at 147.2-147.5'. 148.6-150' DOLOMITE as at 145.7'. 150-151' DOLOMITE, same as at 147.2-147.5'. 151-153.5' DOLOMITE, moderately soft to moderately hard, pitted/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).		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 stuck 15min 16sec (151-152') Airlift Core recovery from outer barrel 151-152' Changed bit at 152' 10min 25sec (152-155') 0.7' rubble Circ. Loss: none	
	150								
	151.5								
	153		86% (54%)						
DATE STARTED: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.			
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LOG OF BORING NO. O-4

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
						DESCRIPTION		
	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.		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.
	156					155-157.6' DOLOMITE, same as above except vuggy/pitted/fossiliferous in very thin bands.		
	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.		
	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).		
	162	R-20	84% (62%)	4.2		161.6-163.3' DOLOMITE, moderately hard, pitted/porous, some vugs, moderately weathered, banded appearance, 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.		Run-20: Drilling Pressure: 250-300 psi Kelly Bar RPM: 200 Enginer RPM: 1200-1300 Drill Time: 5min 54sec (160-160.5') Airlift 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					163.3-164.3' ROD DROP.		
-122.0						164.3-165' As above except vuggy, moderately weathered-sandy		
DATE STARTED: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.		
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						
APPROVED BY:		RIG: Failing 1500						
DRILLING CO.: HUSS								











LOG OF BORING NO. O-4

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.3			DESCRIPTION
-123.0	165	R-21	74% (30%)	3.7		texture.		Run-21: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Engineer RPM: 1200-1300 Drill Time: 1min 47sec (165-166.3') 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 165.3-166.3' (approximate)	
-124.0	166.5					165-165.1' DOLOMITE, moderately soft, dark yellowish orange (10YR 6/6), strong reaction to 1N HCl when powdered, pitted/porous, fossiliferous, sandy texture, moderately to severely weathered, thin bedded. 165.1-165.3' Crystalline DOLOMITE, light olive gray (5Y 6/1), 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'. 166.4-170' DOLOMITE as at 165.1-165.3'.			
168		R-22	86% (48%)	4.3		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 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 fractured (107.7-171'), strong reaction to 1N HCl when powdered.		Run-22: Drilling Pressure: 200-250 psi Kelly Bar RPM: 195 Engineer RPM: 1200 Drill Time: 19min 31sec 0.7' cuttings Circ. Loss: 100% Airlift after end of run	
169.5	171					172.3-173.5' crystalline DOLOMITE, as at 165.1'.			
172.5	174					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 HCl when powdered.			
175.5						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		Run-23: Drilling Pressure: 250-300 psi Kelly Bar RPM: 192	
DATE STARTED: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.			
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program

LOG OF BORING NO. O-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	
						DESCRIPTION			
	177	R-23	96% (76%)	4.8		178.8-179.1' vertical fracture-moderately to intensely fractured), vuggy 177.6-178.7', strong reaction to 1N HCl when powdered.		Enginer RPM: 1100-1200 Drill Time: 18min 8sec 0.3' rubble Circ. Loss: 100%	
	178.5					176.6-176.9' Moderately soft, fresh, not pitted.			
	180					180-180.5' DOLOMITE, moderately hard, thin to medium bedded, few interlayers of crystalline dolomite, fresh to slightly weathered, pitted in bands, unfractured, vuggy in bands, light olive gray (5Y 6/1) to medium light gray (N6), strong reaction to 1N HCl when powdered.		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'	
-138.7	181.5					180.5-181' Crystalline DOLOMITE, medium light gray (N6) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry/ powdered, fresh to slightly weathered, pitted in very thin bands, moderately to intensely fractured, thin to medium bedded.			
-139.5	181.5					181-181.8' ROD DROP.			
	183	R-24	78% (16%)	3.9		181.8-183' DOLOMITE as at 180.5-181'.			
-140.7	183					183-183.4' ROD DROP.			
-141.1	183					183.4-183.5' DOLOMITE as at 180.5', intensely fractured (bedding planes). 183.5-185.2' DOLOMITE same as at 181.8'.			
	184.5					185.2-185.8' DOLOMITE, moderately soft, grayish orange (10YR 7/ 4), moderately to severly weathered, pitted/porous- sandy texture, vuggy, unfractured, medium bedded, weak to moderate reaction to 1N HCl when powdered. 185.8-186.2' As above except intensely fractured/rubble.		Run-25: Drilling Pressure: 250 psi Kelly Bar RPM: 210 Enginer RPM: 1300 Drill Time: 13min 18sec Circ. Loss: 100%	
	186					186.2-186.5' DOLOMITE, light olive gray (5Y 6/1) to moderate yellowish brown (10YR 5/4), moderately soft, banded apperance,			
DATE STARTED: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.			
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									







LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. O-4

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.3			
						DESCRIPTION			
187.5		R-25	90% (70%)	4.5		friable, moderately to severely 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 thin 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						195-196.9' DOLOMITE, moderately soft to moderately hard, pitted/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).		Run-27: Drilling Pressure: 250-300 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 8min 55sec Circ. Loss: 100%	
196.5			100%			196.9-200' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), moderately to intensely fractured, pitted, vuggy, some fossils, thick bedded, slightly to moderately weathered, strong reaction to 1N HCl			
DATE STARTED: 10/6/09		GWL: DEPTH: 5.1'		DATE/TIME: 10/7/09 @ 0745		NOTES: Used NWJ for SPT sampling.			
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-4

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
						DESCRIPTION		
	198	R-27	(28%)	5.0		when powdered, silty texture in weathered areas, with very thin pockets of medium light gray (N6) material.		Run-28: Drilling Pressure: 250 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 13min 33sec 0.3' rubble Circ. Loss: 100% Final water level 10/13/ 09 @ 0750 5.4'.
	199.5					200-202.3' DOLOMITE, as at 195-196.9'.		
	201							
	202.5	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.		
	204							
-162.7						BOTTOM OF BORING 205'		
	205.5							
	207							
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:					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			NOTES: Used NWJ for SPT sampling. RIG: Failing 1500
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			

LNP- Offest Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. 0-5

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
						DESCRIPTION		
	0					0.0-22.0' SAND.	sp	0-22' destructive drilling, log based on cuttings.
	2							
	4							
	6							
	8					7.0-7.4' Weathered DOLOMITE.		
	10							
	12							
	14							

DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:	GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring	NOTES: NA
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500




LOG OF BORING NO. 0-5

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.6			
						DESCRIPTION			
20.6	16								Drillers Notes: circulation loss at 15'.
	18								
	20								
	22								
	24	OB-1	84% (32%)	4.2		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%
	26					25.6-25.9' Very soft.			
	28	OB-2	50% (0%)	1.5		27.0-30.0' As above except intensely fractured.			OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 5min 49sec 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		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offest Boring Program

PROJECT NO. 07-3935




LOG OF BORING NO. 0-5

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	
						DESCRIPTION			
	30	OB-3	36% (0%)	1.8		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 2" of material fall in from above. Driller Notes: very soft from 130'-133'	
	32					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).			
	34	OB-4	28% (14%)	1.4		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%	
	36					37.0-45.0' DOLOMITE, intensely weathered, soft, no recovery of material but cuttings similar to material above.			
	38	OB-5	0% (0%)	0.0				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 sample recovered.	
	40								
	42								
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					DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:									
DRILLING CO.: HUSS									

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)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	USCS SYMBOL	REMARKS	
						DESCRIPTION			
	44								
	46	OB-6	16% (0%)	0.8		45.0-50.0' DOLOMITE, soft, intensely weathered, intensely fractured, no reaction to 1N HCl, 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%	
	48								
	50					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'.	
	52	OB-7	92% (80%)	4.6		51.7' Horizontal fracture.			
	54					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.			
	56					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	80% (74%)	4.0					
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					DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offest Boring Program

PROJECT NO. 07-3935



LOG OF BORING NO. 0-5

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
						DESCRIPTION		
	60	R-1	100% (100%)	5.0		58.8-60.0' DOLOMITE, hard, pale yellowish brown (10YR 6/2) to 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: 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 correct on picture.
	62					60.0-60.5' As above except yellowish gray (5Y 8/1).		
	64					60.5-63.4' DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4).		
	66	R-2	100% (84%)	5.0		63.4-65.0' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), sandy, thinly bedded, pitted, unfractured, moderately weathered, no reaction to 1N HCl, moderate reaction when powdered.		Run-2: Drilling Pressure: 300 psi Kelly Bar RPM: 209 Engine RPM: 1200-1300 Drill Time: 31min 17sec Circulation loss: None Water Level 10/21/09 @ 0747 5.8'.
	68					65.0-70.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 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 HCl, moderate reaction when powdered.		
	70					66.6-67.8' Moderately soft.		
	72	R-3	64% (38%)	3.2		70.0-70.7' As above except pale yellowish brown (10YR 6/2).		Run 3: Drilling Pressure: 300 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 41min 26sec Circulation loss: 0% Driller Notes: bottom 2' soft.
						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 CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring			NOTES: NA
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			

LNP- Offest Boring Program









PROJECT NO. 07-3935

LOG OF BORING NO. 0-5

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
						DESCRIPTION		
-32.4	74	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 HCl, intensely fractured.		Run 4: Drilling Pressure: 300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 35min 53sec (75.0-77.5') 24min 40sec (77.5-80.0') Circulation loss: None Note: Picture in tray mislabeled- shows RUN 3.
	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 HCl.							
-34.5	76					77.1-77.5' DOLOMITE, moderately soft, thinly bedded, moderate yellowish brown (10YR 5/4), intensely fractured, no reaction to 1N HCl.		
	77.1-77.5'					77.5-79.3' Same as 75.0-77.1' except slightly pitted, moderately fractured.		
	78	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	80.0-80.7' As above except moderate yellowish brown (10YR 5/4) and light gray (N7).						
	80.7-81.3'	80.7-81.3' As above except intensely fractured.						
	81.3-85.9'	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					
	82	85.9-86.5' As above except intensely fractured.						
	84	86.5-87.5' DOLOMITE, moderately soft, thinly bedded, pitted, very pale orange (10YR 8/2), slightly fractured, no reaction to 1N HCl, slight reaction when powdered, moderately weathered.						
	86	R-5	100% (84%)	5.0		87.5-89.1' DOLOMITE, hard, thinly bedded, some pits, dark yellowish	Run 6: Drilling Pressure: 250 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 16min 52sec Circulation loss: None	
		R-6	100% (62%)	5.0				
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		
DRILLING CO.: HUSS								








LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. 0-5

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.6			DESCRIPTION
	88					brown (10YR 4/2), no reaction to 1N HCl, weak reaction when powdered, slightly weathered. 88.4' Fracture, filled with organics, no odor.			
	90					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.			
	92	R-7	86% (32%)	4.3		90.0-91.8' DOLOMITE, thick bedded, hard, very pale orange (10YR 8/2), unfractured, some pits filled with dolomite (grayish orange (10YR 7/4)) and a few thin streaks (dusky yellowish brown (10YR 2/2)), strong reaction to 1N HCl, fresh to slightly weathered.		Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 41min 29sec Circulation loss: None Driller Notes: soft 94-95'.	
	94					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.			
	96					93.2-95.7' DOLOMITE, moderately soft, thin bedded, dark yellowish brown (10YR 4/2) with black (N1) streaks, severely weathered, intensely fractured, no reaction to 1N HCl, slight reaction when powdered, pitted.		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% (22%)	5.0		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 HCl, moderate reaction when powdered.			
	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%	
	102								
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring			NOTES: NA	
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody			RIG: Failing 1500	

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. 0-5




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	
						DESCRIPTION			
	104	R-9	98% (66%)	4.9		102.9-105.0' As above except moderately to intensely fractured.		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 R-10 from R-11. 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). 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	
	106					105.0-112.9' As above except slightly fractured (vertical fractures at 106-106.3' and 106.8-107.5').			
	108	R-10	100% (78%)	5.0					
	110								
	112	R-11	100% (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 HCl, moderate reaction when powdered, sandy.			
	114								
	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 HCl, moderate reaction when powdered.			
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring		NOTES: NA		
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500		

LOG OF BORING NO. 0-5

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
						DESCRIPTION		
	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 HCl. 117.4-118.7' DOLOMITE, moderately soft, grayish orange (10YR 7/4), sandy, thin bedded, moderately weathered, slightly fractured, no reaction to 1N HCl.		date.
	120					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 HCl.		Run-13: Drilling Pressure: 350 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 11min 45sec Circulation loss: 50% 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 fallen piece. Picture in tray has incorrect date.
	122	R-13	96% (52%)	4.8		120.0-120.5' DOLOMITE, moderately hard, grayish orange (10YR 7/4), crystalline to sandy, thin bedded, slightly weathered, unfractured, no reaction to 1N HCl, moderate reaction when powdered. 120.5-121.5' As above except intensely fractured-vertical fracture from 120.5-122.0'. 121.5-122.4' As above except slightly fractured.		
	124					122.4-126.2' DOLOMITE, moderately hard, crystalline, very pale orange (10YR 8/2), pitted, slightly weathered, unfractured, no reaction to 1N HCl, moderate reaction when powdered.		
	126					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 HCl. 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	R-14	96% (66%)	4.8		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 HCl, 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%
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				DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. 0-5

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.6			DESCRIPTION
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 HCl, moderate reaction when powdered, some laminations-dark yellowish brown (10YR 4/2) at 134.7'.		<p>Picture in tray shows incorrect date.</p> <p>Run-16: Drilling Pressure: 300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 30min 42sec Circulation loss: 50%</p> <p>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"</p> <p>Run-18: Drilling Pressure: 250 psi Kelly Bar RPM: 208 Engine RPM: 1200-1300 Drill Time: 19min 50sec</p>
134								
136		R-16	100% (32%)	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 reaction to 1N HCl, some fossils.		
138								
140		R-17	100%	5.0		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.		
142				(100%)				
144								
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,		
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		
DRILLING CO.: HUSS								

LNP- Offest Boring Program PROJECT NO. 07-3935




LOG OF BORING NO. 0-5

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
						DESCRIPTION		
	148	R-18	86% (74%)	4.3	[Pattern]	very slightly weathered, thin bedded, no reaction to 1N HCl, moderate to high reaction when powdered.		Circulation loss: 50% Material from above: 3"
	150				[Pattern]	148.1-148.7' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), sandy, thinly laminated, severely 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.		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 14min 57sec Circulation loss: 50%
	152	R-19	100% (92%)	5.0	[Pattern]	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).		
	154				[Pattern]	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).		Run-20: Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 12min 5sec Circulation loss: 50%
	156				[Pattern]	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.		
	158	R-20	100% (72%)	5.0	[Pattern]	156.2-156.6' As above except pale yellowish brown (10YR 6/2), unfractured. 156.6-157.3' Same as 155.0-156.2'. 157.3-160.0' LIMESTONE, moderately hard, sandy to crystalline, very pale orange (10YR 8/2) with light gray (N7), slightly weathered, moderately fractured, medium to strong reaction to 1N HCl.		
	160				[Pattern]	160.0-161.2' As above except unfractured.		Run-21: Drilling Pressure: 250 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400
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		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offest Boring Program

PROJECT NO. 07-3935








LOG OF BORING NO. 0-5

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	
						DESCRIPTION			
-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 to 1N HCl, some pits. 163.0-163.8' DOLOMITE, moderately soft, sandy, dark yellowish brown (10YR 4/2), pitted, moderately weathered, moderately fractured, no reaction to 1N HCl, 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 HCl.		Drill Time: 19min 54sec Circulation loss: 50%	
	164					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.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 195 Engine RPM: 1200-1300 Drill Time: 11min 48sec Circulation loss: 50%	
	166	R-22	100% (54%)	5.0		166.4-166.5' Same as 161.2-161.9'. 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'.			
	168					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 HCl, 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'	
	170					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 HCl. 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, moderately fractured, no reaction to 1N HCl, weak reaction when powdered.			
	172	R-23	98% (46%)	4.9		175.3-176.9' DOLOMITE, hard, thin bedded, broken at 175.3' and		Run-24: Drilling Pressure: 300 psi	
	174								
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
DRILLING CO.: HUSS									

LOG OF BORING NO. 0-5

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	
						DESCRIPTION			
176		R-24	100% (38%)	5.0		175.5', moderately fractured, moderately weathered, sandy, moderate yellowish brown (10YR 5/4) and grayish orange (10YR 7/4), no reaction to 1N HCl.		Kelly Bar RPM: 190 Engine RPM: 1100-1200 Drill Time: 23min 38sec Circulation loss: 50% Water level 10/27/09 @ 0745 6.3'. Run-25: Drilling Pressure: 300-250 psi Kelly Bar RPM: 196-194 Engine RPM: 1200-1300 Drill Time: 13min 58sec (180-183') 8min 26sec (183-185') Circulation loss: 50%	
178	176.9-177.6' DOLOMITE, hard, laminated, sandy, moderate yellowish 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), slightly fractured, fresh, thick bedded, no reaction to 1N HCl. 178.3-179.4' DOLOMITE, moderately soft, sandy, moderate yellowish brown (10YR 5/4), thinly laminated, moderately weathered, pitted, slightly to moderately fractured, no reaction to 1N HCl.								
180	179.4-180.0' Same as 175.3-176.9'.								
182	180.0-181.2' DOLOMITE, hard, fossiliferous, pale yellowish brown (10YR 6/2), slightly weathered, sandy, slightly fractured, pitted, no reaction to 1N HCl, thick bedded.								
184		R-25	100% (40%)	5.0		181.2-181.5' As above except thinly laminated, pale yellowish brown (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 1N HCl. 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 powdered, pitted.		Run-26: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 10min 54sec Circulation loss: 100% Material from above: 1"	
186	185.0-185.9' As above except unfractured.								
188	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 188.1-188.3' (possible core loss zone).								
190		R-26	90% (26%)	4.5		188.3-190.0' DOLOMITE, crystalline, very hard, thick bedded, intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N HCl.		Run-27:	
						190.0-192.0' DOLOMITE, moderately hard, fossiliferous, thick			
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		DRILLER: Eddie Palmer HELPER: Chad/Cody						RIG: Failing 1500	
APPROVED BY:									
DRILLING CO.: HUSS									

LOG OF BORING NO. 0-5

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.6			DESCRIPTION
	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.		Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 7sec Circulation loss: 100% Material from above: 4"
	194					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.		
	196	R-28	79% (8%)	3.9		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 HCl. 195.0-195.3' Same as 188.3-190.0'. 195.3-195.6' Same as above except intensely fractured and broken.		Run-28: Drilling Pressure: 200 psi Kelly Bar RPM: 225 Engine RPM: 1400-1500 Drill Time: 8min 8sec Circulation loss: 100% Material from above: 0.8"
	198					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 HCl. 197.0-201.0', DOLOMITE, hard, sandy, pitted, slightly fractured, thin bedded, moderate yellowish brown (10YR 5/4), moderately weathered, no reaction to 1N HCl.		
	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.		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"
	202					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'.		
	204							
DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:					GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring			NOTES: NA
DRILLING CO.: HUSS					DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			




LNP- Offest Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. 0-5




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	
						DESCRIPTION			
	206	R-30	66% (0%)	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					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.			
	210	R-31	90% (48%)	4.5		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 HCl. 211.6-212.4' As above except fossiliferous.		Run-31: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 9min 5sec Circulation loss: 100%	
	212					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 HCl. 212.9-213.3' DOLOMITE, moderately soft, thinly laminated, moderately weathered, unfractured, sandy, moderate yellowish brown (10YR 5/4), no reaction to 1N HCl, weak reaction when powdered.			
	214					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	R-32	66% (0%)	3.3		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					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 HCl. 217.9-219.3' DOLOMITE, moderately soft, severely weathered, sandy, some pits, grayish orange pink (5YR 7/2), slightly fractured, no reaction to 1N HCl.			
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
DRILLING CO.: HUSS									

LNP- Offest Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. 0-5

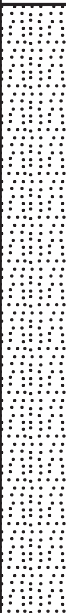

ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	USCS SYMBOL	REMARKS
						DESCRIPTION		
	220	R-33	78% (18%)	3.9		219.3-221.1' DOLOMITE, moderately hard, sandy to crystalline, slightly weathered, intensely fractured, grayish orange (10YR 7/4), thick bedded, no reaction to 1N HCl.		R-33: Drilling Pressure: 250 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 3min 35sec Circulation loss: 100% Material from above: 0.4'
	222					221.1-222.0' DOLOMITE, moderately soft, sandy, grayish orange (10YR 7/4), thin bedded, severely weathered, unfractured, no reaction to 1N HCl.		
	224					222.0-222.5' DOLOMITE, soft, sandy, severely weathered, pale yellowish brown (10YR 6/2), intensely fractured, thin bedded, no reaction to 1N HCl.		
	226					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 HCl.		
	228	R-34	74% (18%)	3.7		223.1-223.3' As above except intensely fractured/crushed.		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'
	230					223.3-228.0' DOLOMITE, soft, sandy, severely weathered, intensely fractured, moderate yellowish brown (10YR 5/4), pitted, no reaction with 1N HCl.		
	232	R-35	8% (0%)	0.4		228.0-228.3' As above except very soft.		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 clean hole of cuttings from soft dolomite.
	234					228.3-230.0' As above except moderately soft.		
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: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring CHECKED BY: JLO APPROVED BY:						NOTES: NA		
DRILLING CO.: HUSS						DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500

LNP- Offest Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. 0-5

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	
						DESCRIPTION			
	236	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 HCl.		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'	
	238					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 HCl, thick bedded.			
-197.4	240					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 HCl.	BOTTOM OF BORING 240'		
	242								
	244								
	246								
	248								
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		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-6

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
						DESCRIPTION		
37.2	0 1.5 3 4.5 6 7.5 9 10.5					0.0-5.0' POORLY GRADED SAND (sp), fine grained, well sorted.	sp	0-14' Drilled destructively-log based on cuttings.
					5.0-13.0' SANDY CLAY (cl), low plasticity, sand-fine grained (40%), clay (60%).	5' cl		








DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offset Boring Program PROJECT NO. 07-3935
LOG OF BORING NO. O-6

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			
						DESCRIPTION			
29.2	12				[Hatched Profile]				
					[Cross-hatched Profile]	13.0-14.0' CLAYEY SAND.	13'	sc	
28.2	13.5				[Dotted Profile]	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.	14'		Switched to Coring OB-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 15min 8sec Circ. Loss: None Driller Notes: 14.8-16.0' core loss zone.
	15	OB-1	76% (34%)	3.8	[Cross-hatched Profile]	17.6-19' Vertical fracture, becomes moderately soft.			
	18				[Cross-hatched Profile]	19.0-22.3' DOLOMITE, as above except fossiliferous, slightly to moderately weathered, slightly fractured (horizontal).			OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 27min 44sec Circ. Loss: None NOTE: Lots of rig chatter, 0.1' fall-in from above.
	19.5				[Cross-hatched Profile]				
	21	OB-2	92% (54%)	4.6	[Cross-hatched Profile]				
DATE STARTED: 10/29/09					GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA
DATE COMPLETED: 11/2/09					GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845		
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring				
CHECKED BY: WDS									
APPROVED BY:					DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**

LOG OF BORING NO. O-6








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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
	22.5					22.3-22.5' Rubble zone. 22.5-24' DOLOMITE, as above except moderately hard to hard, few fossils, vertical fracture 22.5-24.0', more crystalline.		OB-3: Drilling Pressure: 200-250 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 20min 6sec Circ. Loss: None NOTE: lots of rig chatter approximately halfway through run.
	24					24-29' DOLOMITE, moderately hard to moderately soft, moderately 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 when powdered, coarse grained, friable.		
	25.5	OB-3	72% (46%)	3.6				
	27							
	28.5					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).		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 taken in tray before being put into box.
	30					30.0-34.0' DOLOMITE, same as 24.0-29.0'.		
	31.5	OB-4	58% (32%)	2.9				
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA		
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring				RIG: Failing 1500		
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody				
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
	33							
	34.5							
	36	OB-5	94% (72%)	4.7		34.0-39.0' 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.		OB-5: Drilling Pressure: 250 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 39min 8sec Circ. Loss: None NOTE: 0.2' fall-in from above.
	37.5							
	39	OB-6	100% (70%)	1.0		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).		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: 1100-1200 Drill Time: 8min 20sec Circ. Loss: None
	40.5					40.0-41.0' DOLOMITE, as at 34.0-39.0'.		
	42	R-1	52% (0%)	2.6		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 severely weathered, coarse grained, few vugs, some fossils, medium bedded, intensely fractured, moderate to strong reaction to 1N HCl when powdered.		
	43.5							
DATE STARTED: 10/29/09					GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745		NOTES: NA	
DATE COMPLETED: 11/2/09					GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845			
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring			
CHECKED BY: WDS								
APPROVED BY:					DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500	
DRILLING CO.: HUSS								

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-6






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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
	45							
	46.5							
	48	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.
	49.5							
	51							
	52.5	R-3	90% (30%)	4.5		50.0-55.0' DOLOMITE, moderately hard, moderately weathered, pitted/porous, pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately fractured (vertical fractures 50.9-51.6' and 53-53.8'), thick bedded, weak to moderate reaction to 1N HCl when powdered, some fossils.		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'.
	54							

DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: 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.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.2			DESCRIPTION
	55.5	R-4	88% (38%)	4.4		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-5	96% (28%)	4.8		60.0-64.6' DOLOMITE, same as above except 60.0-64.6' 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	
	60								
	61.5								
	63					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 STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA			
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program

PROJECT NO. 07-3935

LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
66								Drill Time: 9min 42sec Circ. Loss: None
	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 thin 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					69.1-69.5' As above except very pitted/fossiliferous. 69.5-70.0' DOLOMITE, as at 65.0-66.4'.		
	70.5					70.0-71.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 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.		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 Driller Notes: soft at 72.5'
	72	R-7	72% (44%)	3.6		72.0-72.5' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to medium light gray (N6), moderately hard to hard, strong reaction to 1N HCl when dry, pitted in very thin bands, no fossils, intensely fractured. 72.5-75.0' DOLOMITE, same as 71.0-72.0' except slightly fractured.		
	73.5							
	75					75.0-75.5' DOLOMITE, moderately hard, moderately weathered, 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) 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.		Run-8: 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.
	76.5							
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA		
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								











LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6

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		USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			
						DESCRIPTION			
	78	R-8	74% (14%)	3.7		76.9' Becomes moderately weathered (dark yellowish orange (10YR 6/6)), friable in very thin zones.			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.
-37.8						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.		80'	
-39.3		R-9	80% (42%)	4.0		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.		81.5'	
	81					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.
	82.5								
	84								
	85.5	R-10	92% (52%)	4.6					
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA			
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									





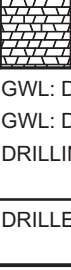

LNP- Offset Boring Program **PROJECT NO. 07-3935**

LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
	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').		
	90					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
	91.5					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 to 1N HCl when powdered, few pits, medium to thick bedded, unfractured.		
	93	R-11	100% (50%)	5.0		93.0-95.0' DOLOMITE (yellowish gray (5Y 7/2) as above) except with very thin laminae of medium light gray (N6).		
	94.5					94.1-95.0' Becomes moderately to intensely fractured.		
						95.0-95.8' DOLOMITE, as above except intensely fractured- vertical fractures.		Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 10min 25sec Circ. Loss: None
	96					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 HCl when powdered.		
	97.5	R-12	100% (50%)	5.0		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 HCl when powdered, thick bedded, slightly fractured, some black organic material (vertical orientation).		
						98.6-99.1' Becomes slightly weathered, slightly pitted.		
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA		
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring				RIG: Failing 1500		
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody				
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6




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
						DESCRIPTION		
	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					115-116.6' 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 NOTE: 0.4' fall-in from above. Water level 10/31/09 @ 0755 6.3'.
	115.5					116.6-118.1' DOLOMITE as above except fossiliferous, pitted/vuggy.		
	117	R-16	100% (60%)	5.0		118.1-118.4' DOLOMITE, same as 115-116.6'. 118.4-119.5' DOLOMITE, same as 116.6-118.1'.		
	118.5					119.5-121.3' DOLOMITE, as at 115-116.6'.		Run-17: Drilling Pressure: 250 psi Kelly Bar RPM: 190 Engine RPM: 1100-1200
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA		
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring				RIG: Failing 1500		
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody				
APPROVED BY:								
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6

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
						DESCRIPTION		
	121.5	R-17	100% (74%)	5.0		121.3-123.4' DOLOMITE, as at 116.6-118.1'.		Drill Time: 6min 3sec Circ. Loss: None
	123					123.4-125.0' DOLOMITE, as at 119.5-121.3'.		
	124.5	R-18	100% (96%)	5.0		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 Drill Time: 10min 0sec Circ. Loss: None
	126					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.		
	127.5					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).		
	129					130.2-130.8' DOLOMITE, same as 125.6-128.8' except moderately fractured (all horizontal-bedding planes).		
	130.5					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, recalculated percent recovery, RQD not affected.
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA		
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845				
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring						
CHECKED BY: WDS								
APPROVED BY:		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500		
DRILLING CO.: HUSS								

LNP- Offset Boring Program **PROJECT NO. 07-3935**
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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
						DESCRIPTION		
	132	R-19	94% (32%)	4.7				
	133.5							
	135	R-20	96% (70%)	4.8				Run-20: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 17min 26sec Circ. Loss: None NOTE: 0.2' from previous run, 0.4' fall-in (re-drill marks).
	136.5							
	138							
	139.5	R-21	96%	4.8				Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 6sec Circ. Loss: None
	141							
	142.5							

DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:	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
DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500

LNP- Offset Boring Program

PROJECT NO. 07-3935







LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
	144		(60%)			143.0-143.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), thin to medium bedded, no fossils, fresh, pitted in very thin bands, unfractured.		
	145.5					143.5-145.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), strong reaction to 1N HCl when powdered, thick bedded, fossiliferous, unfractured, slightly weathered.		
	147	R-22	100% (80%)	5.0		145.0-150.0' DOLOMITE, moderately hard, yellowish gray (5Y 7/2) to 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.		Run-22: 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							
	150					149.5-149.7' With thin beds of crystalline DOLOMITE.		
	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				GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA
DATE COMPLETED: 11/2/09				GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845		
FIELD GEOLOGIST: JLO				DRILLING METHOD: Mud Rotary/PQ3 Coring				
CHECKED BY: WDS				DRILLER: Eddie Palmer				RIG: Failing 1500
APPROVED BY:				HELPER: Chad/Cody				
DRILLING CO.: HUSS								

LNP- Offset Boring Program

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
						DESCRIPTION		
	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, strong reaction to 1N HCl when powdered. 156.5-160.0' DOLOMITE as at 155.2-156.1' except yellowish gray (5Y 7/2), fossiliferous, no crystalline dolomite bands, thick bedded, slightly fractured.		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				
	159					160.0-160.5' DOLOMITE, as at 155.2-156.1'.		Run-25: Drilling Pressure: 250-300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 11min 44sec Circ. Loss: None
	160.5					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.		
	162	R-25	80% (22%)	4.0		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: 10/29/09					GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745		NOTES: NA	
DATE COMPLETED: 11/2/09					GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845			
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring			
CHECKED BY: WDS								
APPROVED BY:					DRILLER: Eddie Palmer HELPER: Chad/Cody		RIG: Failing 1500	
DRILLING CO.: HUSS								

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6



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	USCS SYMBOL	REMARKS
						SURFACE EL: 42.2			DESCRIPTION
-123.4	165	R-26	90% (40%)	4.5		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') 8min 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).
-123.8	165.6				165.6-166.0' ROD DROP.			
166.5	166.5	R-26	90% (40%)	4.5		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 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.		Run-27: Drilling Pressure: 200-250 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 13min 10sec Circ. Loss: None NOTE: Lots of rig chatter, 0.3' fall-in from above.
168	168				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. 170.2-170.6' Vertical fracture-open.			
169.5	169.5	R-27	94% (46%)	4.7		175.0-178.1' Alternating layer of moderately weathered DOLOMITE and crystalline DOLOMITE as above.		Run-28: Drilling Pressure: 200 psi Kelly Bar RPM: 197
171	171				171			
172.5	172.5							
174	174							
175.5	175.5							

DATE STARTED: 10/29/09	GWL: DEPTH: 5.8'	DATE/TIME: 10/30/09 @ 0745	NOTES: NA
DATE COMPLETED: 11/2/09	GWL: DEPTH: 5.7'	DATE/TIME: 11/2/09 @ 0845	
FIELD GEOLOGIST: JLO	DRILLING METHOD: Mud Rotary/PQ3 Coring		
CHECKED BY: WDS			
APPROVED BY:	DRILLER: Eddie Palmer	HELPER: Chad/Cody	RIG: Failing 1500
DRILLING CO.: HUSS			

LNP- Offset Boring Program







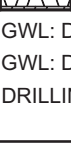
LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.2			DESCRIPTION
	177	R-28	90% (16%)	4.5				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).	
	178.5					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 vugs-almost 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).			
	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 of run.	
	181.5	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).			
	183					184.1-184.4' Crystalline DOLOMITE. 184.4-185.6' DOLOMITE as at 182.7-184.1' except thinly laminated (fissile-like).			
	184.5					185.6-185.9' Fossiliferous DOLOMITE as at 182.7-184.1'.		Run-30: Drilling Pressure: 200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 14min 50sec Circ. Loss: None NOTE: 0.2' fall-in from above.	
	186					185.9-188.4' Alternating layers of moderately weathered DOLOMITE and crystalline DOLOMITE as at 180.0' (layers 0.7- 1.3' thick).			
DATE STARTED: 10/29/09					GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA
DATE COMPLETED: 11/2/09					GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845		
FIELD GEOLOGIST: JLO					DRILLING METHOD: Mud Rotary/PQ3 Coring				
CHECKED BY: WDS					DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program PROJECT NO. 07-3935

LOG OF BORING NO. O-6

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	USCS SYMBOL	REMARKS	
						SURFACE EL: 42.2			DESCRIPTION
	187.5	R-30	100% (34%)	5.0					
	189					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.			
	190.5					189.9-190.0' Crystalline DOLOMITE as above. 190.0-191.0' Crystalline DOLOMITE as above except moderately weathered.		Run-31: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 36sec Circ. Loss: None	
	192					191.0-192.0' DOLOMITE same as at 188.4-189.9'.			
	193.5	R-31	100% (18%)	5.0		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					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-32: Drilling Pressure: 400 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 9min 15sec Circ. Loss: None	
	196.5		80%						
DATE STARTED: 10/29/09		GWL: DEPTH: 5.8'		DATE/TIME: 10/30/09 @ 0745		NOTES: NA			
DATE COMPLETED: 11/2/09		GWL: DEPTH: 5.7'		DATE/TIME: 11/2/09 @ 0845					
FIELD GEOLOGIST: JLO		DRILLING METHOD: Mud Rotary/PQ3 Coring							
CHECKED BY: WDS		DRILLER: Eddie Palmer		HELPER: Chad/Cody		RIG: Failing 1500			
APPROVED BY:									
DRILLING CO.: HUSS									

LNP- Offset Boring Program **PROJECT NO. 07-3935**
LOG OF BORING NO. O-6

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			
						DESCRIPTION					
	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.		Run-33: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 6min 47sec Circ. Loss: None			
	199.5					200.0-201.6' Crystalline DOLOMITE as above except moderately to intensely fractured, with few very thin black organic (possibly) laminations.					
	201					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.					
	202.5	R-33	100% (20%)	5.0							
	204										
-162.8						BOTTOM OF BORING 205'					
	205.5										
	207										
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY:				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			
DRILLING CO.: HUSS				DRILLER: Eddie Palmer HELPER: Chad/Cody				RIG: Failing 1500			