GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S. Nicely	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-903	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 15.6
COLLAR ELEV. 301.6 ft (NAVD88)	**NORTHING** 3,909,812 **US ft (NAD83)**	**EASTING** 11,686,029 **US ft (NAD83)**	**24 HR.** 16.8
TOTAL DEPTH 151.0 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/7/06	**COMPLETED** 11/9/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
301.6					Asphalt Roadway				301.6 0.0
293.7	7.9								No sampling from 0.0 to 7.9 ft due to utility clearance operations (vac. track) 293.7 7.9
290.5	11.1	10	8	14	22	903-1			Silty, fine to medium SAND (SM), pale yellow (2.5Y 7/4 & 5Y 7/3) and white (10YR 8/1), dry to moist, medium dense to dense (Residual Soil)
288.0	13.6	11	17	18	35	903-2			
283.0	18.6	12	16	14	30	903-3	▽		
277.9	23.7	13	21	26	47	903-4			280.6 21.0
273.0	28.6	50/0.3				903-5			Weathered Rock: Light gray (5Y 7/2) to brownish yellow (10YR 6/6), moist, very dense, weathered, BIOTITE-QUARTZ GNEISS
268.0	33.6	22	50/0.3			903-6			
265.6	36.0	50/0.1				903-7			267.9 33.7 Hard Rock: Yellowish brown, moderate severely weathered, very closely to closely fractured, soft to medium hard, BIOTITE-QUARTZ GNEISS
235.6	66.0	50/0.3				903-8			Hard Rock-Weathered Rock: Yellowish brown, gray, tan, reddish brown, and dark green, very severely to moderately weathered, very closely to closely fractured, very soft to hard, BIOTITE-QUARTZ GNEISS

NORTH ANNA COL CORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

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ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
226.8					Continued from previous page				
225.6	76.0	50/0.1				903-9			Hard Rock-Weathered Rock: Yellowish brown, gray, tan, reddish brown, and dark green, very severely to moderately weathered, very closely to closely fractured, very soft to hard, BIOTITE-QUARTZ GNEISS *(continued)*
220.8	80.8								Hard Rock: Reddish brown and gray, moderate severely to slightly weathered, very closely to closely fractured, soft to very hard, BIOTITE-QUARTZ GNEISS
185.6	116.0								Hard Rock: Gray with reddish brown, slightly weathered to fresh, very closely to widely fractured, very hard, BIOTITE-QUARTZ GNEISS

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ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
152.0					Continued from previous page				
	150.6								Boring and coring terminated at 151.0 ft in Hard Rock: Very hard BIOTITE-QUARTZ GNEISS 151.0

NORTH ANNA COL ... NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07

GEOTECHNICAL CORING LOG

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TOTAL DEPTH 151.0 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/7/06	**COMPLETED** 11/9/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 116.9 ft		

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Begin Coring @ 33.7 ft
267.9	33.7	2.3	2:20 1:49 0:14/0.3	(2.3) 100%	(0.8) 35%	1				267.9 Hard Rock: Yellowish brown, moderate severely weathered, very closely to closely fractured, soft to medium hard, BIOTITE-QUARTZ GNEISS 33.7
265.6	36.0									265.6 -Highly fractured throughout run 36.0
260.6	41.0	5.0	0:53 1:09 1:15 1:36 1:33	(1.7) 34%	(0.0) 0%	2				Hard Rock-Weathered Rock: Yellowish brown, gray, tan, reddish brown, and dark green, very severely to moderately weathered, very closely to closely fractured, very soft to hard, BIOTITE-QUARTZ GNEISS -Highly fractured throughout run; no recovery from 36.0-39.3 ft -Highly fractured throughout run; no recovery from 42.0-44.2 ft
255.6	46.0	5.0	3:41 1:23 1:16 2:16 4:07	(2.9) 58%	(0.5) 10%	3				
250.6	51.0	5.0	1:55 2:02 2:44 6:38 5:39	(3.2) 64%	(0.0) 0%	4				-Highly fractured throughout run; no recovery from 46.0-47.8 ft
245.6	56.0	5.0	2:53 4:40 4:34 6:00 6:26	(3.2) 64%	(0.0) 0%	5				-Highly fractured throughout run; quartz vein from 53.2-53.9 ft
240.6	61.0	5.0	3:58 3:32 4:08 6:40 2:15	(2.6) 52%	(0.0) 0%	6				-Highly fractured throughout run with Fe staining and clay seams
235.6	66.0	5.0	2:10 2:15 5:10 4:15 6:34	(0.5) 10%	(0.0) 0%	7				-Very poor recovery
235.3	66.3	4.7	N=50/0.3 4:04 3:27 1:26 4:20 6:23/0.7	(3.1) 66%	(0.4) 9%	903-8 8				-Highly fractured throughout run with Fe staining and clay on joint surfaces; no recovery from 68.1-69.6 ft
230.6	71.0	5.0	1:31 1:32 5:35 10:34 3:23	(1.1) 22%	(0.0) 0%	9				-Very poor recovery, highly fractured
225.5	76.1	4.7	N=50/0.1 2:07 2:35 4:11 4:54 7:21/0.7	(2.5) 53%	(0.6) 13%	903-9 10				-Highly fractured throughout run with Fe staining and clay seams; no rrecovery from 76.1-78.6 ft
220.8	80.8									220.8 80.8
215.6	86.0	5.2	2:19 2:35 2:31 2:27 2:49/1.2	(5.1) 98%	(4.6) 88%	11				Hard Rock: Reddish brown and gray, moderate severely to slightly weathered, very closely to closely fractured, soft to very hard, BIOTITE-QUARTZ GNEISS (3 joints at 60-65°, 2 joints at30-40°, and 2 joints at 20-30° all with Fe staining; quartz veins at 85.4 ft, and 83.2-83.4 ft, and vugs)
210.6	91.0	5.0	2:16 2:17 1:57 2:10 2:52	(4.8) 96%	(2.0) 40%	12				-Highly fractured throughout run with Fe staining
205.6	96.0	5.0	2:54 2:21 2:38 2:41 2:46	(5.0) 100%	(4.9) 98%	13				(2 joints at 40-50°and 2 joints at 20-30° with Fe staining and trace clay)
200.6	101.0	5.0	2:36 2:17 2:26 2:57 3:06	(5.0) 100%	(4.8) 96%	14				(4 joints at 70°, 1 joint at 30°, and 1 joint at 45° all with Fe staining)
195.6	106.0	5.0	6:05 2:51 4:29 3:33 2:34	(4.5) 90%	(3.0) 60%	15				-Highly fractured and weathered from 101.8-101.9 ft and 103.7-104.0 ft; 1 joint at 45° with clay
		5.0	3:24 3:01	(5.0) 100%	(3.4) 68%	16				-Highly fractured throughout run

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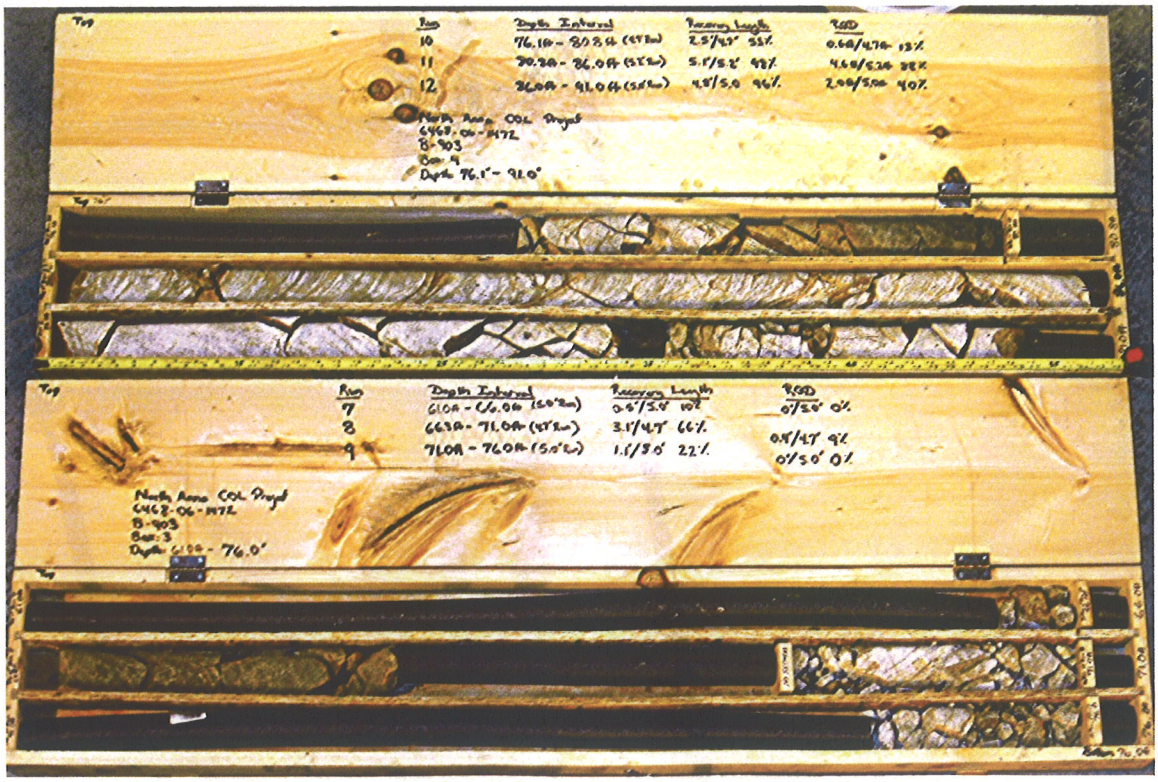
CORE SIZE HQ3	**TOTAL RUN** 116.9 ft		

ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Continued from previous page
190.6	111.0		2:31 2:28 2:07							Hard Rock: Reddish brown and gray, moderate severely to slightly weathered, very closely to closely fractured, soft to very hard, BIOTITE-QUARTZ GNEISS *(continued)* (5 joints at 20-30°, 2 joints at 70-80°, and 1 joint at 10° all with Fe staining)
185.6	116.0	5.0	1:57 1:51 1:47 2:13 2:02	(4.8) 96%	(4.3) 86%	17				185.6 — 116.0
180.6	121.0	5.0	2:23 2:46 3:13 3:04 3:09	(5.0) 100%	(4.9) 98%	18				Hard Rock: Gray with reddish brown, slightly weathered to fresh, very closely to widely fractured, very hard, BIOTITE-QUARTZ GNEISS (4 joints at 20-30° and 2 joints at 40-50° with Fe stain and trace clay)
175.6	126.0	5.0	3:32 3:39 3:34 3:59 3:46	(5.0) 100%	(5.0) 100%	19				(1 joint at 45° with Fe staining)
170.6	131.0	5.0	3:27 5:41 5:03 6:56 8:31	(5.0) 100%	(5.0) 100%	20				-Quartz vein from 126.8-128.9 ft, no joints
169.2	132.4	1.4	9:49 6:31/0.4	(1.4) 100%	(1.4) 100%	21				-No joints
165.6	136.0	3.6	2:26/0.6 4:17 4:01 4:37	(3.6) 100%	(3.5) 97%	22				(1 joint at 20°; quartz vein at 135.2-136.0 ft; plagioclase veins at 133.4 ft and 133.9 ft)
160.6	141.0	5.0	4:27 3:37 6:08 7:05 7:12	(4.9) 98%	(4.9) 98%	23				-0.1 ft diameter quartz vug at 139.0 ft
155.6	146.0	5.0	4:19 4:28 6:22 4:14 3:59	(5.1) 102%	(5.1) 102%	24				-No Joints
150.6	151.0	5.0	4:59 4:00 4:39 4:52 5:09	(5.0) 100%	(5.0) 100%	25				-No Joints; several small (<0.1 ft) quartz veins at 148.0 ft, 148.3 ft, and 149.5 ft 150.6 — 151.0 Coring terminated at 151.0 ft in Hard Rock: Very hard, BIOTITE-QUARTZ GNEISS

B-903 – Box 1
B-903 – Box 2



B-903 – Box 4
B-903 – Box 3

B-903 – Box 6
B-903 – Box 5

B-903 – Box 7
B-903 – Box 8