GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST J. Howard
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-905	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 306.8 ft (NAVD88)	NORTHING 3,909,733 US ft (NAD83)	EASTING 11,685,822 US ft (NAD83)
TOTAL DEPTH 150.4 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 9/19/06	COMPLETED 9/25/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	23.0
24 HR.	21.9

HAMMER TYPE 140 lbs Auto

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
306.8					Ground Surface				306.8 — 0.0
305.3	1.5								Silty SAND (SM), reddish yellow (7.5YR 6/8), pinkish gray (7.5YR 7/2), reddish yellow (7.5YR 6/6), and light gray (5YR 7/1), dry, medium dense to very dense, micaceous and saprolitic (Residual Soil)
303.8	3.0	6	6	6	12	905-1			
		7	10	13	23	905-2			
298.3	8.5								
		6	8	9	17	905-3			
291.9	14.9								
		13	16	14	30	905-4			
286.9	19.9								
		27	27	30	57	905-5			
282.9									23.9
281.9	24.9								Weathered Rock: Gray to tan, BIOTITE GNEISS
280.7	26.1	50/0.3				905-6			280.7 — 26.1
		50/0.0				905-7			Hard Rock: Tan gray, moderately to very slightly weathered, close to moderately close fracturing, medium hard to hard, QUARTZ GNEISS
266.3									40.5
									Hard Rock: Blue-gray to tan-gray, moderately weathered to fresh, close to moderately close fracturing, hard to very hard, BIOTITE GNEISS

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

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TOTAL DEPTH 150.4 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins	HAMMER TYPE 140 lbs Auto
DATE STARTED 9/19/06	COMPLETED 9/25/06	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
231.9					Continued from previous page				
									229.0 — 77.8
									Weathered Rock: Tan-gray, severely weathered, BIOTITE GNEISS
									226.6 — 80.2
									Hard Rock: Gray-tan, light gray, and blue-gray, moderate severely weathered to fresh, very close to moderately close fracturing, medium hard to hard, BIOTITE GNEISS
									185.0 — 121.8
									Weathered Rock: BIOTITE GNEISS-little to no recovery
									181.4 — 125.4
									Hard Rock: Gray-tan and blue-gray, moderately weathered to fresh, very close to wide fracturing, hard to very hard, BIOTITE GNEISS, locally with quartz and feldspar veins
									159.2 — 147.6

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TOTAL DEPTH 150.4 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 9/19/06	COMPLETED 9/25/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	23.0
24 HR.	21.9

HAMMER TYPE 140 lbs Auto

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
157.1					Continued from previous page				
									156.4 Hard Rock: Blue-gray and brown, moderately to slightly weathered, moderately close fracturing, moderately hard, BIOTITE GNEISS *(continued)* 150.4
									Boring and coring terminated at 150.4 ft in Hard Rock: Hard, BIOTITE GNEISS

GEOTECHNICAL CORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Howard
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-905	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — 0 HR. 23.0
COLLAR ELEV. 306.8 ft (NAVD88)	**NORTHING** 3,909,733 US ft (NAD83)	**EASTING** 11,685,822 US ft (NAD83) — 24 HR. 21.9
TOTAL DEPTH 150.4 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 9/19/06	**COMPLETED** 9/25/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline
CORE SIZE HQ3	**TOTAL RUN** 124.3 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 @ 26.1 ft
280.7	26.1	4.4	N=50/0.0 2:00 1:30 0:30 1:00	(2.2) 50%	(2.2) 50%	1				280.7 — 26.1 Hard Rock: Tan gray, moderately to very slightly weathered, close to moderately close fracturing, medium hard to hard, QUARTZ GNEISS
276.3	30.5	4.9	1:30/0.4 2:00 1:45 1:15 1:30 3:00/0.9	(3.9) 80%	(3.0) 61%	2				
271.4	35.4	5.1	3:00 3:00 2:30 3:15 3:30/1.1	(5.1) 100%	(5.1) 100%	3				(2 joints at 80°)
266.3	40.5	5.0	3:45 4:15 5:00 7:15 4:30	(4.7) 94%	(4.7) 94%	4				266.3 — 40.5 Hard Rock: Blue-gray to tan-gray, moderately weathered to fresh, close to moderately close fracturing, hard to very hard, BIOTITE GNEISS (1 joint at 40°, 1 joint at 75°, 2 joints at 20°; loss of circulation from 44.4 to 44.6 ft)
261.3	45.5	4.9	5:00 7:00 7:15 10:30 9:30/0.9	(4.9) 100%	(4.9) 100%	5				(1 joint at 10°, 1 joint at 80°, 2 joints at 50°)
256.4	50.4	4.8	3:00 8:30 7:15 6:45 7:30/0.8	(4.2) 88%	(3.4) 71%	6				
251.6	55.2	5.1	9:15 3:45 3:00 2:30 4:00/1.1	(5.1) 100%	(4.2) 82%	7				(4 joints at 30-40°)
246.5	60.3	4.9	6:45 3:00 3:45 6:30 8:00/0.9	(4.9) 100%	(4.9) 100%	8				(2 joints at 20°, 2 joints at 40°)
241.6	65.2	5.1	6:00 3:00 1:45 2:00 2:15/1.1	(4.8) 94%	(4.0) 78%	9				(3 joints at 30°, 1 joint at 10°)
236.5	70.3	2.9	4:00 2:15 2:30/0.9	(2.9) 100%	(1.3) 45%	10				(5 joints at 10°, 1 joint at 50°, 1 joint at 85°; trace epidote)
233.6	73.2	7.0	3:30 4:00 3:30 3:45 2:30 3:30 5:00	(5.3) 76%	(4.7) 67%	11				(4 joints at 10°, 1 joint at 85°) 229.0 — 77.8 Weathered Rock: Tan-gray, severely weathered, BIOTITE GNEISS
226.6	80.2	5.3	4:30 4:45 5:00 6:00 5:15	(5.3) 100%	(3.8) 72%	12				226.6 — 80.2 Hard Rock: Gray-tan, light gray, and blue-gray, moderate severely weathered to fresh, very close to moderately close fracturing, medium hard to hard, BIOTITE GNEISS (7 joints at 20°, 3 joints at 80°)
221.3	85.5	5.0	2:45 2:00 3:45 3:30 4:30	(3.3) 66%	(0.5) 10%	13				
216.3	90.5	5.0	2:30 2:00 2:15 2:00 2:00	(3.5) 70%	(1.3) 26%	14				(2 joints at 40°, 1 joint at 85°)
211.3	95.5	5.0	1:45 1:30 1:30 1:15 1:00	(4.5) 90%	(3.8) 76%	15				(3 joints at 60°, 1 joint at 85°)
206.3	100.5									

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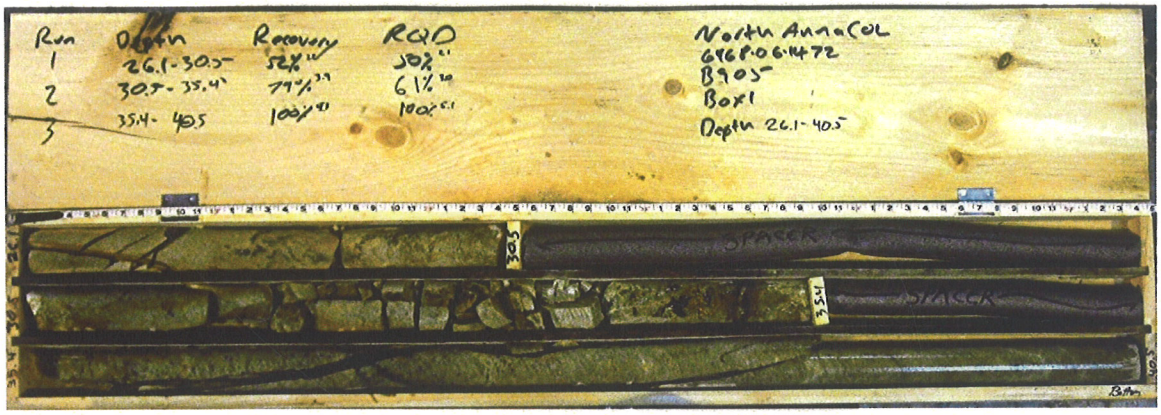
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-905	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 306.8 ft (NAVD88)	NORTHING 3,909,733 US ft (NAD83)	EASTING 11,685,822 US ft (NAD83)
TOTAL DEPTH 150.4 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 9/19/06	COMPLETED 9/25/06	CORE BARREL TYPE: HQ 3 triple tube-wireline
CORE SIZE HQ3	TOTAL RUN 124.3 ft	

GROUND WATER (ft)	
0 HR.	23.0
24 HR.	21.9

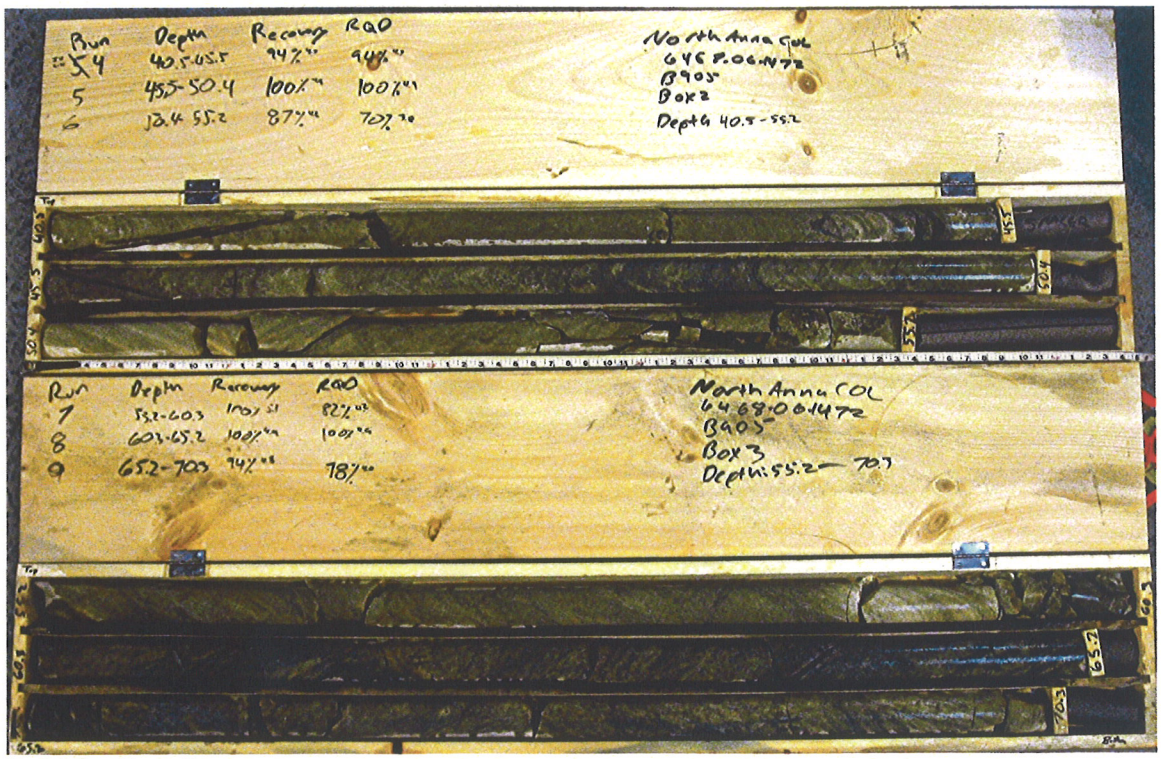
HAMMER TYPE 140 lbs Auto

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
201.3	105.5	5.0	1:30 ND ND ND ND	(5.0) 100%	(4.8) 96%	16				(2 joints at 10°, 2 joints at 60-70°) Hard Rock: Gray-tan, light gray, and blue-gray, moderate severely weathered to fresh, very close to moderately close fracturing, medium hard to hard, BIOTITE GNEISS *(continued)*
196.3	110.5	5.0	2:00 1:45 1:30 1:15 1:45	(5.0) 100%	(4.5) 90%	17				(1 joint at 20°, 2 joints at 40-50°; quartz+feldspar veins)
191.3	115.5	5.0	2:45/2.0 2:00 1:30 1:45	(4.7) 94%	(4.2) 84%	18				(4 joints at 10-20°, 2 joints at 50°)
186.3	120.5	5.0	1:30 1:15 1:30 1:45 1:45	(4.3) 86%	(2.7) 54%	19				(3 joints at 30-40°, 4 joints at 50-60°)
181.4	125.4	4.9	3:00 3:15 2:00 2:15 2:30/0.9	(1.6) 33%	(0.4) 8%	20				185.0 — 121.8 Weathered Rock: BIOTITE GNEISS-little to no recovery 181.4 — 125.4
179.4	127.4	2.0	2:00/2.0	(2.0) 100%	(1.2) 60%	21				Hard Rock: Gray-tan and blue-gray, moderately weathered to fresh, very close to wide fracturing, hard to very hard, BIOTITE GNEISS, locally with quartz and feldspar veins
176.2	130.6	3.2	1:15 1:00 2:00 0:30/0.2	(2.6) 81%	(1.2) 38%	22				(3 joints at 30°)
171.3	135.5	4.9	2:15 2:00 4:00 3:00 4:30/0.9	(4.9) 100%	(4.9) 100%	23				(2 joints at 40°, 1 joint at 30°, 1 joint at 0°; quartz+feldspar veins)
168.1	138.7	3.2	6:30 6:00 12:30 4:00/0.2	(3.2) 100%	(3.2) 100%	24				-No Joints
161.5	145.3	6.6	6:30 6:30 3:00 3:30 4:00 6:00/1.6	(6.6) 100%	(6.6) 100%	25				-No Joints
156.4	150.4	5.1	6:45 6:15 2:30 2:30 2:00/1.1	(5.1) 100%	(5.0) 98%	26				(3 joints at 40°) 159.2 — 147.6 Hard Rock: Blue-gray and brown, moderately to slightly weathered, moderately close fracturing, moderately hard, BIOTITE GNEISS 156.4 — 150.4 Coring terminated at 150.4 ft in Hard Rock: Hard, BIOTITE GNEISS

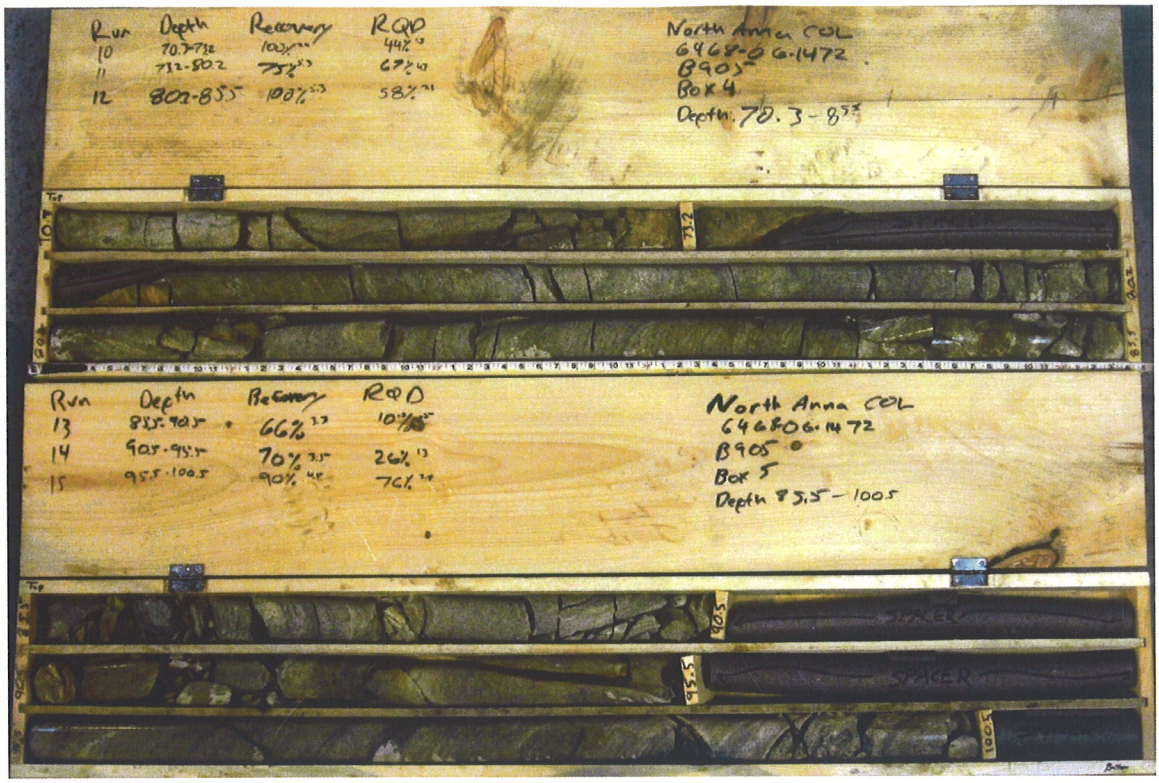
NORTH ANNA COL CORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07



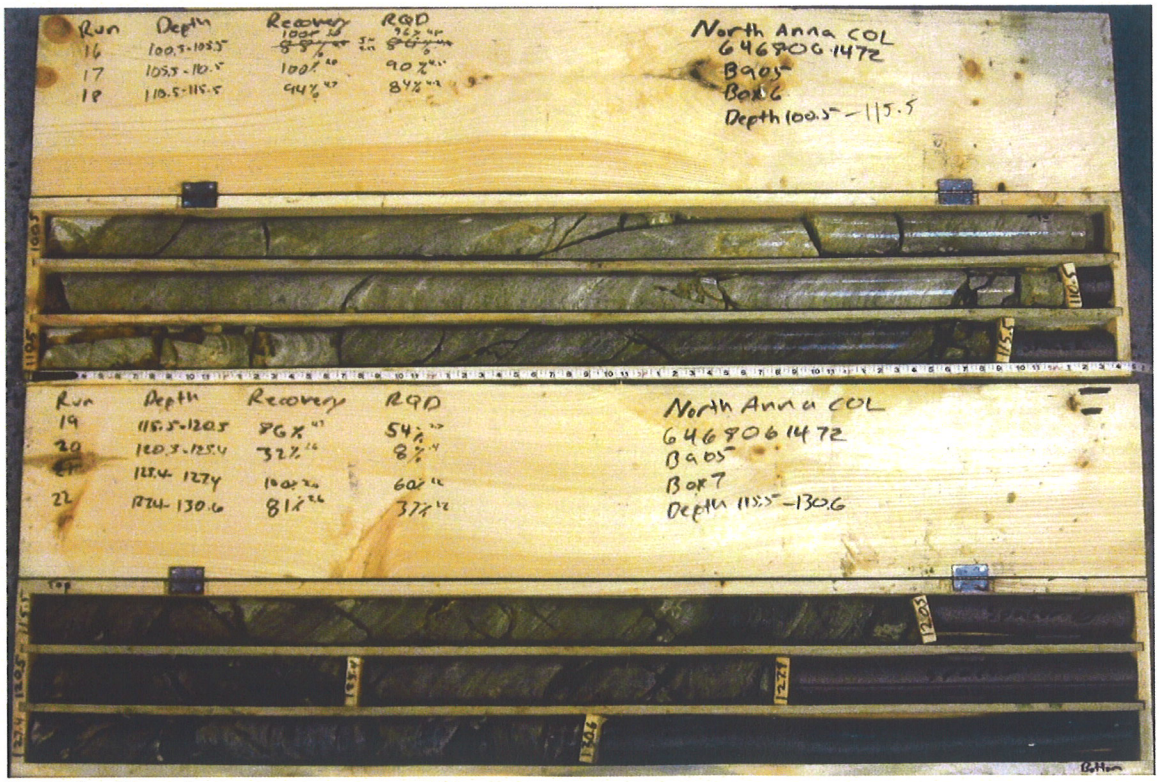
B-905 – Box 1



B-905 – Box 2
B-905 – Box 3



B-905 – Box 4
B-905 – Box 5



B-905 – Box 6
B-905 – Box 7

B-905 – Box 8
B-905 – Box 9