GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Wallen/J. Howard	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 11.9
COLLAR ELEV. 297.5 ft (NAVD88)	**NORTHING** 3,909,940 US ft (NAD83)	**EASTING** 11,685,922 US ft (NAD83)	**24 HR.** 23.5
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**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
297.5					Ground Surface				297.5 — 0.0
296.0	1.5								Silty, fine to medium SAND (SM), reddish brown (5YR 5/4), dry, medium dense (Fill)
294.0	3.5	8	7	6	13	914-1			294.5 — 3.0
291.5	6.0	12	4	5	9	914-2			Clayey SAND (SC), yellowish brown (10YR 5/6), moist, stiff (Residual Soil)
289.0	8.5	4	6	8	14	914-3			292.5 — 5.0
286.5	11.0	5	7	6	13	914-4			Silty, fine to coarse SAND (SM), yellowish brown (10YR 5/6), moist, medium dense, trace rock fragments (Residual Soil)
284.0	13.5	4	6	7	13	914-5	▽		
278.5	19.0	8	11	9	20	914-6			
273.6	23.9	11	15	9	24	914-7			275.5 — 22.0
261.9	35.6	50/0.2			47	914-8	▼		Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS
256.9	40.6	8	12	35		914-9			272.4 — 25.1
251.9	45.6	28	30	43	73	914-10			Silty, fine to coarse SAND (SM), yellowish brown (10YR 5/6), moist, dense to very dense, rock fabric (Residual Soil)
		50/0.1				914-11			255.4 — 42.1
									Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS
									253.0 — 44.5
									Hard Rock: Dark gray to blue gray with brown Fe staining, moderately severely to moderately weathered, very close to close fracturing, soft to hard, BIOTITE-QUARTZ GNEISS
									236.9 — 60.6
									Hard Rock: Light blue gray to blue gray with pink, slightly weathered to fresh, close to moderately close fracturing, hard to very hard, QUARTZ GNEISS

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

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SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 11.9
COLLAR ELEV. 297.5 ft (NAVD88)	**NORTHING** 3,909,940 US ft (NAD83)	**EASTING** 11,685,922 US ft (NAD83)	**24 HR.** 23.5
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**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
222.6					Continued from previous page				Hard Rock: Light blue gray to blue gray with pink, slightly weathered to fresh, close to moderately close fracturing, hard to very hard, QUARTZ GNEISS *(continued)*
202.1	95.4								Hard Rock: Blue gray with green, moderately weathered to fresh, very close to wide fracturing, medium hard to very hard, BIOTITE GNEISS

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BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 11.9
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TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**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
147.8					Continued from previous page				
									Hard Rock: Blue gray with green, moderately weathered to fresh, very close to wide fracturing, medium hard to very hard, BIOTITE GNEISS *(continued)*
									97.0 200.5 Boring and coring terminated at 200.5 ft in Hard Rock: Very hard, BIOTITE GNEISS

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

GEOTECHNICAL CORING LOG

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MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Wallen/J. Howard
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 11.9
COLLAR ELEV. 297.5 ft **(NAVD88)**	**NORTHING** 3,909,940 **US ft (NAD83)**	**EASTING** 11,685,922 **US ft (NAD83)** — **24 HR.** 23.5
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline
CORE SIZE HQ3	**TOTAL RUN** 172.8 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 @ 24.6 ft
272.9	24.6	5.9	2:47/0.9 1:04 1:10 0:56 1:19 1:01	(3.0) 51%	(0.0) 0%	1				272.4 — 25.1 Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS *(continued)* Silty, fine to coarse SAND (SM), yellowish brown (10YR 5/6), moist, dense to very dense, rock fabric (Residual Soil)
267.0	30.5									
		5.1	1:19 1:32 1:42 0:54 1:01/1.1	(0.8) 16%	(0.0) 0%	2				
261.9	35.6									
			N=47			*914-9*				
260.4	37.1	3.5	1:12/0.5 1:38 1:51 2:38	(2.2) 63%	(0.0) 0%	3				
256.9	40.6									
			N=73			*914-10*				255.4 — 42.1
255.4	42.1	3.5	1:54/0.5 1:13 1:32 1:13	(1.7) 49%	(0.4) 11%	4				Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS (2 joints at 40°, 1 joint at 5°) — 253.0 — 44.5 Hard Rock: Dark gray to blue gray with brown Fe staining, moderately severely to moderately weathered, very close to close fracturing, soft to hard, BIOTITE-QUARTZ GNEISS
251.9	45.6									
251.8	45.7	4.9	*N=50/0.1* 2:44 2:52 2:01 2:36 3:47/0.9	(1.7) 35%	(0.3) 6%	*914-11* 5				
246.9	50.6									
		5.0	3:20 2:43 5:48 3:27 2:07	(3.7) 74%	(1.9) 38%	6				(4 joints at 5° and 1 joint at 70° with Fe staining; Quartz vein from 51.6-51.9 ft)
241.9	55.6									
		5.0	3:00 2:06 2:55 2:58 3:22	(2.4) 48%	(0.4) 8%	7				
236.9	60.6									236.9 — 60.6
		5.0	2:00 2:00 2:00 2:15 2:15	(5.0) 100%	(4.1) 82%	UC-63.8'				Hard Rock: Light blue gray to blue gray with pink, slightly weathered to fresh, close to moderately close fracturing, hard to very hard, QUARTZ GNEISS (Joints at 20-40°; Quartz+hornblende+pyrite veins)
231.9	65.6									
		5.0	2:00 2:30 2:30 3:00 3:15	(5.0) 100%	(4.1) 82%	9				(Joints at 30-60°)
226.9	70.6									
		5.1	2:15 3:00 4:30 6:00 8:15/1.1	(5.0) 98%	(4.3) 84%	UC-75.3'				(Joints at 20-70°)
221.8	75.7									
		5.1	7:30 4:00 4:15 5:30 7:00/1.1	(5.0) 98%	(5.0) 98%	11				-No Joints
216.7	80.8									
		4.6	12:00 8:00 7:15 9:30 9:00/0.6	(4.6) 100%	(3.8) 83%	12				(Joints at 20-80°)
212.1	85.4									
		5.0	9:15 8:30 6:45 7:15 8:00	(5.0) 100%	(5.0) 100%	13				(Joints at 50-70°)
207.1	90.4									
		5.0	6:15 4:00 4:15 5:45 8:30	(4.9) 98%	(3.6) 72%	14				(Joints at 10-80°)
202.1	95.4									202.1 — 95.4
		5.1	5:00 5:30 5:00 6:00	(5.1) 100%	(5.1) 100%	UCS-95.8'				Hard Rock: Blue gray with green, moderately weathered to fresh, very close to wide fracturing, medium hard to very hard, BIOTITE GNEISS (Joints at 40°)

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

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SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**	
BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 11.9
COLLAR ELEV. 297.5 ft **(NAVD88)**	**NORTHING** 3,909,940 **US ft (NAD83)**	**EASTING** 11,685,922 **US ft (NAD83)**	**24 HR.** 23.5
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 172.8 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
197.0	100.5		7:15/1.1							Hard Rock: Blue gray with green, moderately weathered to fresh, very close to wide fracturing, medium hard to very hard, BIOTITE GNEISS *(continued)*
		5.0	4:30 4:30 3:15 4:45 4:30	(5.0) 100%	(5.0) 100%	16				(Joints at 10°)
192.0	105.5									
		5.0	3:00 2:45 3:15 3:00 3:00	(4.9) 98%	(4.9) 98%	17				(Joints at 0-5°; Quartz vein)
187.0	110.5									
		5.0	2:30 3:15 4:00 4:45 4:00	(4.9) 98%	(4.9) 98%	18				(Joints at 80°)
182.0	115.5									
		4.8	4:45 8:30 7:30 6:00 7:00/0.8	(4.8) 100%	(4.8) 100%	19				
177.2	120.3									
		5.4	5:00 4:30 4:30 3:30 5:00/1.4	(5.4) 100%	(4.4) 81%	UC-120.6'				(Joints at 20-40°; Quartz+hornblende vein)
171.8	125.7									
		5.0	3:30 3:00 3:15 3:15 2:45	(5.0) 100%	(5.0) 100%	21				(Joints at 10-60°)
166.8	130.7									
		4.9	2:30 2:00 2:30 2:30 2:30/0.9	(4.7) 96%	(4.0) 82%	22				(Joints at 30-50° with brown Fe staining)
161.9	135.6									
		5.0	2:30 2:30 2:15 2:15 2:00	(5.0) 100%	(5.0) 100%	23				-No Joints
156.9	140.6									
		5.0	3:00 3:00 2:45 4:00 4:45	(5.0) 100%	(4.5) 90%	24				(Joints at 70°)
151.9	145.6									
		5.0	4:15 3:15 3:00 2:15 2:30	(5.0) 100%	(5.0) 100%	25				(Quartz+feldspar veins; No Joints)
146.9	150.6									
		5.0	4:00 3:00 3:30 2:00 2:45	(4.8) 96%	(4.7) 94%	UCS-151.4'				(Joints at 50°)
141.9	155.6									
		5.0	2:45 2:45 2:45 2:45 2:00	(4.6) 92%	(1.1) 22%	27				
136.9	160.6									
		5.0	2:00 3:00 3:00 3:45 3:00	(4.4) 88%	(2.5) 50%	28				(Joints at 5-40°; quartz vein)
131.9	165.6									
		5.0	2:00 3:15 3:00 4:15 5:15	(5.0) 100%	(4.2) 84%	29				
126.9	170.6									
		5.0	3:00 3:45 7:30	(5.0) 100%	(3.4) 68%	30				(Joints at 50-90°)

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BORING NO. B-914	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 11.9
COLLAR ELEV. 297.5 ft **(NAVD88)**	**NORTHING** 3,909,940 **US ft (NAD83)**	**EASTING** 11,685,922 **US ft (NAD83)** — **24 HR.** 23.5
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/22/06	**COMPLETED** 8/29/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline
CORE SIZE HQ3	**TOTAL RUN** 172.8 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
121.9	175.6		3:30 3:00							Hard Rock: Blue gray with green, moderately weathered to fresh, very close to wide fracturing, medium hard to very hard, BIOTITE GNEISS *(continued)*
		4.9	3:30 4:30 4:30 4:45 8:30/0.9	(4.9) 100%	(4.9) 100%	31				
117.0	180.5									(joints at 20-70°)
		5.0	4:00 3:00 3:00 3:00 3:00	(5.0) 100%	(4.6) 92%	32				
112.0	185.5									
		5.0	6:00 3:30 4:00 4:15 5:45	(4.7) 94%	(4.2) 84%	33				
107.0	190.5									(Joints at 70°)
		5.0	9:00 10:30 4:00 4:15 4:45	(5.0) 100%	(5.0) 100%	UC-192.7'				
102.0	195.5									(Joints at 50°)
		5.0	5:30 5:00 6:00 5:30 6:45	(5.0) 100%	(4.9) 98%	35				
97.0	200.5									97.0 — 200.5 Coring terminated at 200.5 ft in Hard Rock: Very hard, BIOTITE GNEISS

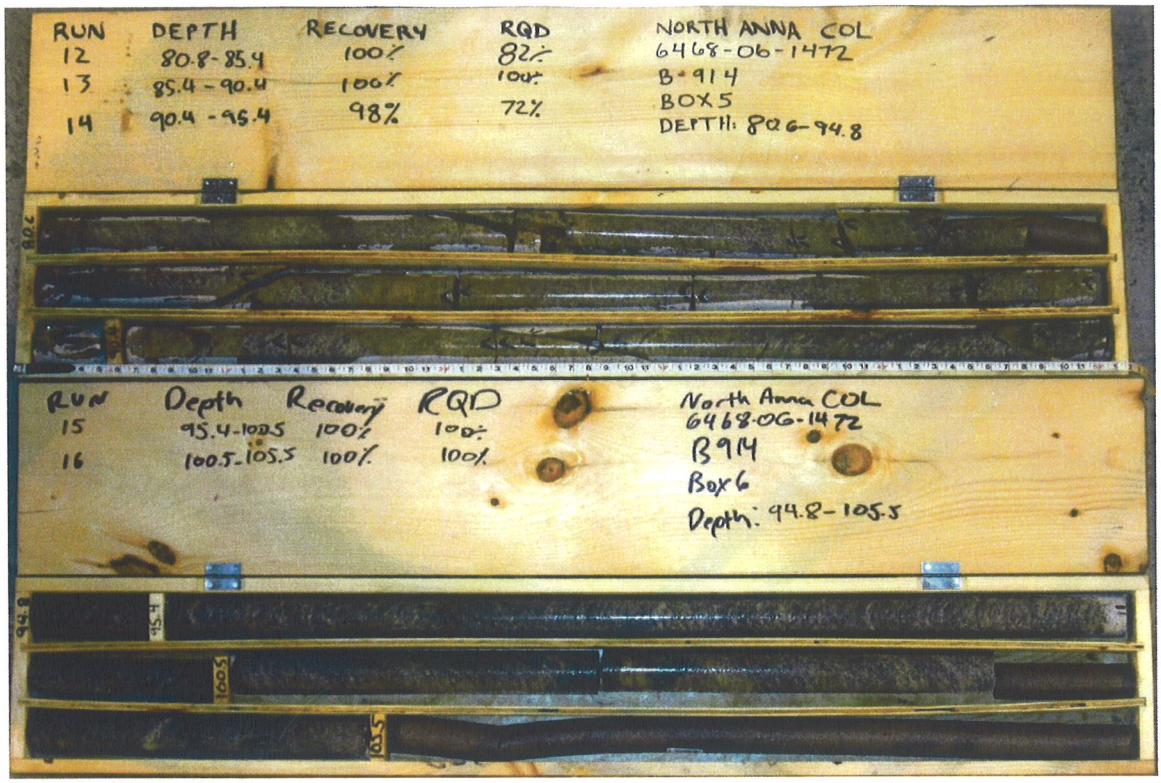
NORTH ANNA CO... JRE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07



B-914 – Box 1
B-914 – Box 2



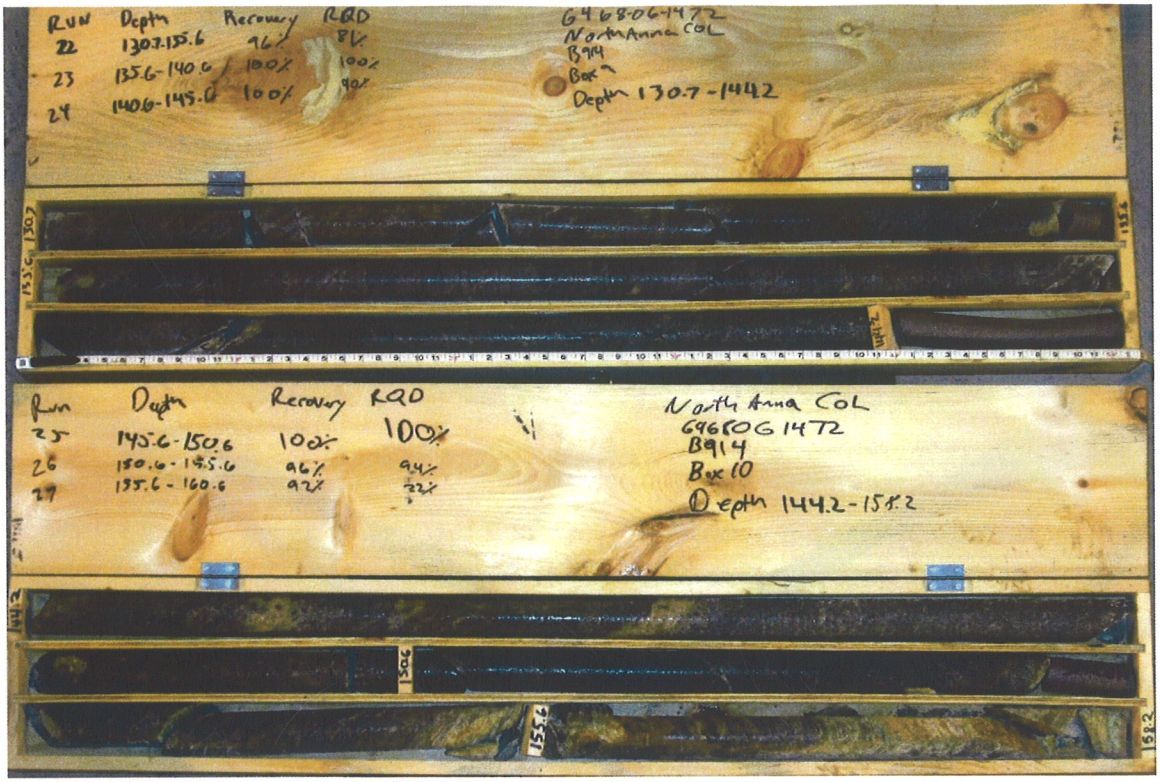
B-914 – Box 3
B-914 – Box 4



B-914 – Box 5
B-914 – Box 6



B-914 – Box 7
B-914 – Box 8



B-914 – Box 9
B-914 – Box 10



B-914 – Box 11
B-914 – Box 12



B-914 – Box 13
B-914 – Box 14