GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST J. Lachewitz
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-951	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE	0 HR. 9.0
COLLAR ELEV. 249.9 ft (NAVD88)	NORTHING 3,910,548 US ft (NAD83)	EASTING 11,686,822 US ft (NAD83)	24 HR. 5.3
TOTAL DEPTH 101.0 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins	HAMMER TYPE 140 lbs Auto
DATE STARTED 8/16/06	COMPLETED 8/17/06	CORE BARREL TYPE: HQ 3 triple tube-wireline	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
249.9					Ground Surface				249.9 / 0.0
248.4	1.5								Silty SAND (SM) reddish brown (5YR 4/3) and brown (7.5YR 5/4), moist, medium dense to loose (Fill)
246.4	3.5	5	5	8	13	951-1			
243.9	6.0	4	5	4	9	951-2			244.4 / 5.5
241.4	8.5	3	3	5	8	951-3			SILT (ML) yellowish red (5YR 4/6), moist, stiff to very stiff, micaceous, sandy, trace gravel (Fill)
238.9	11.0	5	6	6	12	951-4			
236.4	13.5	2	5	7	12	951-5			
230.4	19.5	3	7	9	16	951-6			233.9 / 16.0
									Silty, fine to coarse SAND (SM) dark greenish gray (GLEY1 4/10Y) and strong brown (7.5YR 4/6&5/8), moist, very dense (Residual Soil)
225.4	24.5	14	22	35	57	951-7			
220.4	29.5	28	35	38	73	951-8			
215.4	34.5	20	26	27	53	951-9			
210.4	39.5	20	42	44	86	951-10			212.9 / 37.0
		50/0.3				951-11			Weathered Rock: Strong brown (7.5YR 5/8), moist, very dense, severely weathered, QUARTZ GNEISS 209.3 / 40.6
									Hard Rock: Light reddish brown, reddish brown, pinkish white, bluish gray, and white, moderately severe to slightly weathered, very close to close fracturing, soft to moderately hard, QUARTZ GNEISS with biotite
									179.9 / 70.0
									Hard Rock: White, slightly weathered to fresh, close to wide fracturing, moderately hard to very hard. QUARTZ GNEISS with biotite and trace magnetite

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SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-951	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 249.9 ft (NAVD88)	NORTHING 3,910,548 US ft (NAD83)	EASTING 11,686,822 US ft (NAD83)
TOTAL DEPTH 101.0 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 8/16/06	COMPLETED 8/17/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	9.0
24 HR.	5.3

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
175.1					Continued from previous page				
									Hard Rock: White, slightly weathered to fresh, close to wide fracturing, moderately hard to very hard, QUARTZ GNEISS with biotite and trace magnetite *(continued)*
									148.9 — 101.0
									Boring and coring terminated at 101.0 ft in Hard Rock: Very hard, QUARTZ GNEISS with biotite

GEOTECHNICAL CORING LOG

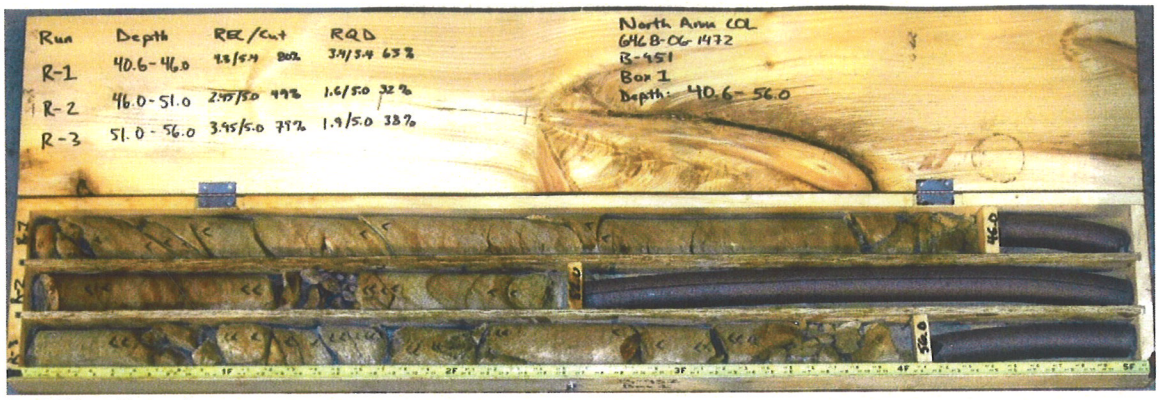
MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST J. Lachewitz
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-951	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 249.9 ft (NAVD88)	NORTHING 3,910,548 US ft (NAD83)	EASTING 11,686,822 US ft (NAD83)
TOTAL DEPTH 101.0 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 8/16/06	COMPLETED 8/17/06	CORE BARREL TYPE: HQ 3 triple tube-wireline
CORE SIZE HQ3	TOTAL RUN 60.4 ft	

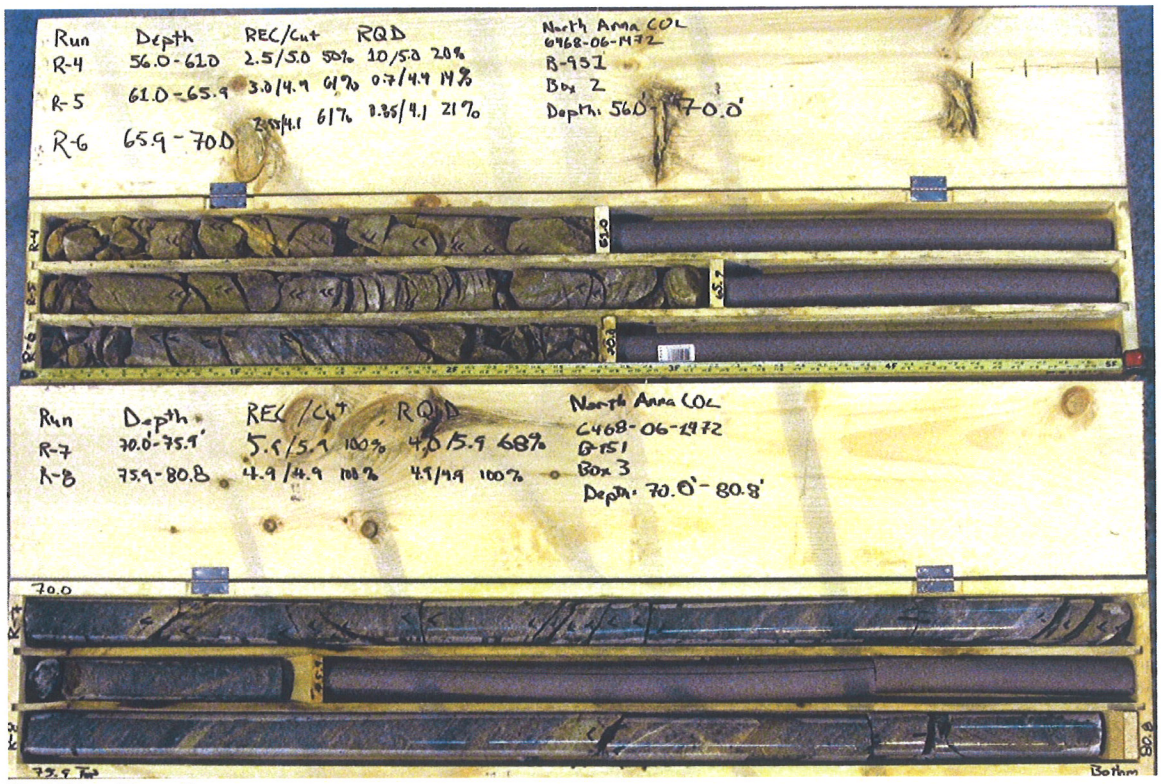
GROUND WATER (ft)	
0 HR.	9.0
24 HR.	5.3

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
										Begin Coring @ 40.6 ft
209.3	40.6	5.4	1:19 1:20 1:27 1:46 1:28/1.4	(4.3) 80%	(3.4) 63%	1				209.3 Hard Rock: Light reddish brown, reddish brown, pinkish white, bluish gray, and white, moderately severe to slightly weathered, very close to close fracturing, soft to moderately hard, QUARTZ GNEISS with biotite 40.6 (4 joints at 0-60° with trace clay and Fe staining)
203.9	46.0	5.0	1:59 1:05 1:11 1:28 1:16	(2.5) 50%	(1.6) 32%	2				(4 joints at 15-35° with trace clay and Fe staining)
198.9	51.0	5.0	1:07 1:10 0:44 1:07 1:21	(4.0) 79%	(1.9) 38%	3				-Multiple joints throughout with trace clay and Fe staining
193.9	56.0	5.0	2:00 2:00 2:00 0:57 1:30	(2.5) 50%	(1.0) 20%	4				-Multiple joints throughout with trace clay and Fe staining
188.9	61.0	4.9	1:24 1:18 1:20 1:19 1:18/0.9	(3.0) 61%	(0.7) 14%	5				-Multiple joints throughout; quartz vein from 64.7-64.9 ft
184.0	65.9	4.1	1:19 2:40 1:45 2:23 1:46/0.1	(2.6) 63%	(0.9) 22%	6				(4 joints at 10-45° with Fe staining)
179.9	70.0	5.9	3:30 2:19 2:10 2:13 1:59 3:06/0.9	(5.9) 100%	(4.0) 68%	7				179.9 70.0 Hard Rock: White, slightly weathered to fresh, close to wide fracturing, moderately hard to very hard, QUARTZ GNEISS with biotite and trace magnetite (10 joints at 5-50° with Fe staining)
174.0	75.9	4.9	2:36 3:03 4:01 4:53 8:12/0.9	(4.9) 100%	(4.9) 100%	8				(Quartz vein at 35° at 78.6 ft with hornblende)
169.1	80.8	5.0	6:00 3:27 4:32 4:41 6:21	(5.0) 100%	(5.0) 100%	9				(2 joints at 35° with slight weathering)
164.1	85.8	5.1	3:09 3:10 2:38 3:33 3:48/1.1	(5.1) 100%	(5.1) 100%	10				(1 joint at 35° with very slight weathering)
159.0	90.9	4.6	4:06 3:04 3:17 6:15 7:56/0.6	(4.6) 100%	(4.6) 100%	11				(2 joints at 40° with very slight weathering)
154.4	95.5	5.5	4:15 2:44 2:48 2:36 6:09/1.5	(5.0) 91%	(4.3) 78%	12				(Quartz vein at 99.5-100.5 ft)
148.9	101.0									148.9 101.0 Coring terminated at 101.0 ft in Hard Rock: Very hard, QUARTZ GNEISS with biotite



B-951 – Box 1



B-951 – Box 2
B-951 – Box 3

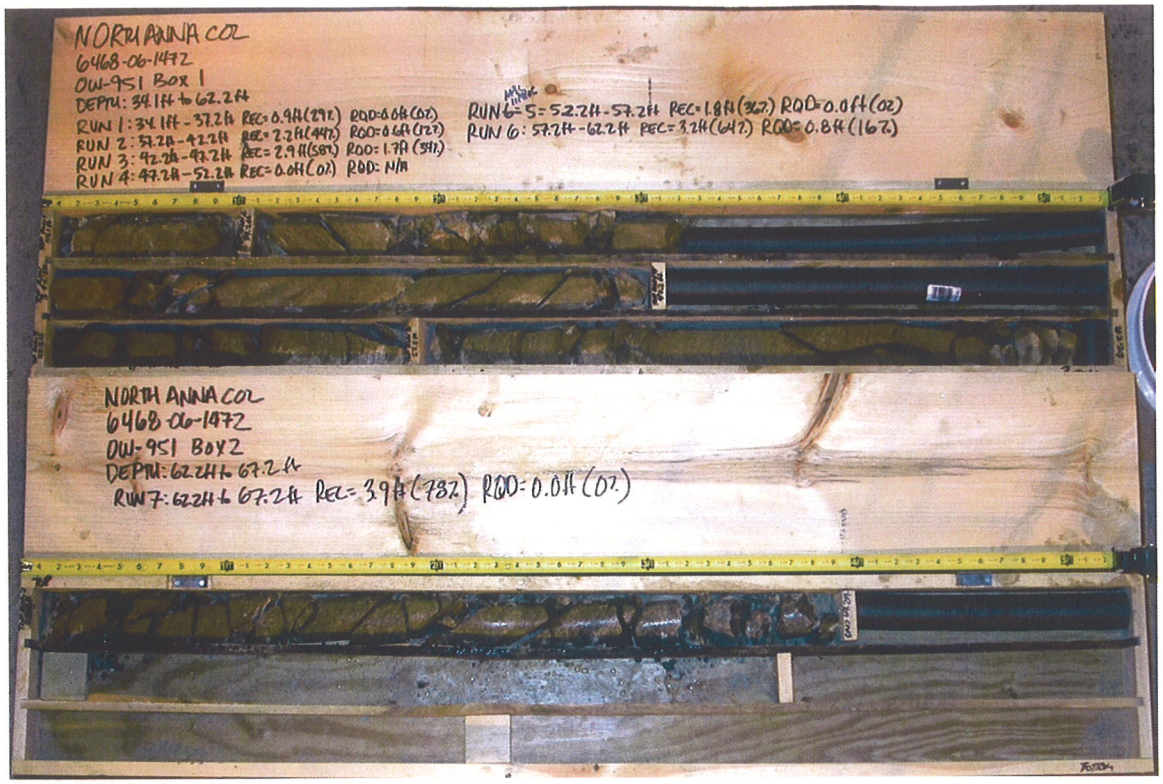
B-951 – Box 4
B-951 – Box 5

GEOTECHNICAL CORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** M. Lear/ K. Charles-Smith
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. OW-951	**DRILL METHOD: HSA/Core**	**SAMPLE METHODS: CORE** — **0 HR.** ND
COLLAR ELEV. 249.7 ft **(NAVD88)**	**NORTHING** 3,910,521 **US ft (NAD83)**	**EASTING** 11,686,786 **US ft (NAD83)** — **24 HR.** ND
TOTAL DEPTH 67.2 ft	**DRILL MACHINE** CME 55LC Track	**DRILLER: D. White** — **HAMMER TYPE** NA
DATE STARTED 11/8/06	**COMPLETED** 11/9/06	**CORE BARREL TYPE: HQ 3 triple tube-wireline**
CORE SIZE HQ3	**TOTAL RUN** 33.1 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 @ 34.1 ft
215.6	34.1	3.1	4:20 1:05 1:08	(0.9) 29%	(0.0) 0%	1				214.7 Hard Rock: Tan-orange, moderately severely weathered, closely fractured, medium hard, BIOTITE-QUARTZ GNEISS (4 joints at 40-50° with clay and orange Fe stain) 35.0
212.5	37.2	5.0	1:08/0.1 0:52 0:53 1:05 1:08 1:36	(2.2) 44%	(0.6) 12%	2				Weathered Rock: No Recovery-BIOTITE-QUARTZ GNEISS 209.7 40.0
207.5	42.2	5.0	1:55 2:18 1:45 1:48 1:13	(2.9) 58%	(1.7) 34%	3				Hard Rock: Tan, moderately severe to moderately weathered, very closely to closely fractured, medium hard to moderately hard, BIOTITE-QUARTZ GNEISS (7 joints at 40-50° with clay and orange-brown Fe stain) 204.6 45.1
202.5	47.2	5.0	1:06 1:33 1:47 1:44 1:24	(0.0) 0%	(0.0) 0%	4				Weathered Rock: No Recovery-BIOTITE-QUARTZ GNEISS -No Recovery
197.5	52.2	5.0	2:15 1:34 2:02 1:58 2:16	(1.8) 36%	(0.0) 0%	5				194.3 55.4
192.5	57.2	5.0	2:05 2:07 2:00 2:05 2:14	(3.2) 64%	(0.8) 16%	6				Hard Rock: Tan-gray to gray, moderately to slightly weathered, very closely to closely fractured, moderately hard, BIOTITE-QUARTZ GNEISS -Numerous joints at 40-50° with clay and orange-brown Fe stain.
187.5	62.2	5.0	1:49 2:23 2:34 3:24 6:10	(3.8) 76%	(0.8) 16%	7				-Numerous joints at 45-50° with trace clay and Fe stain.
182.5	67.2									182.5 67.2
										Coring terminated at 67.2 ft in Hard Rock: Moderately hard, BIOTITE-QUARTZ GNEISS Note: 4.25" Hollow Stem Augers advanced to 34.1 ft without SPT's, boring then advanced with core tools.



OW-951 – Box 1
OW-951 – Box 2