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-939	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 17.8
COLLAR ELEV. 254.0 ft (NAVD88)	**NORTHING** 3,911,318 US ft (NAD83)	**EASTING** 11,686,606 US ft (NAD83)	**24 HR.** 16.1
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 9/20/06	**COMPLETED** 9/21/06	**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
254.0					Ground Surface				254.0 / 0.0
252.8	1.2								Silty, fine to coarse SAND (SM) yellowish brown (10YR 5/6), moist, medium dense (Fill)
250.2	3.8	26	19	7	26	939-1			250.5 / 3.5
247.7	6.3	4	6	9	15	939-2			Sandy CLAY (CL) yellowish brown (10YR 5/4), moist, stiff, silt (Fill)
245.2	8.8	6	6	9	15	939-3			248.0 / 6.0
242.7	11.3	4	3	7	10	939-4			Silty, fine to coarse SAND (SM) yellowish brown (10YR 5/6), dark brown (10YR 3/3), and dark yellowish brown (10YR 3/6), moist, medium dense, trace clay and gravel (Fill)
240.2	13.8	3	3	7	10	939-5			
235.3	18.7	4	7	8	15	939-6			
230.2	23.8	3	7	7	14	939-7			
225.2	28.8	7	11	9	20	939-8			228.0 / 26.0
220.2	33.8	5	7	5	12	939-9			Sandy SILT (ML) yellowish red (5YR 4/6), moist, stiff, clay (Fill)
215.2	38.8	3	3	5	8	939-10			
210.2	43.8	15	25	42	67	939-11			216.0 / 38.0
205.2	48.8	27	48	50/0.3		939-12			Silty, fine to coarse SAND (SM) brownish yellow (10YR 6/8), moist, very dense (Residual Soil)
202.8	51.2	50/0.2				939-13			209.2 / 44.8
192.8	61.2	50/0.1				939-14			Weathered Rock: Yellowish brown (10YR 5/8&5/6), light brownish red and reddish brown, severely weathered, very close to close fracturing, soft to medium hard, BIOTITE-QUARTZ GNEISS
187.9	66.1	50/0.4				939-15			
182.9	71.1	50/0.4				939-16			
		50/0.2				939-17			

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

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-939	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 17.8
COLLAR ELEV. 254.0 ft (NAVD88)	**NORTHING** 3,911,318 US ft (NAD83)	**EASTING** 11,686,606 US ft (NAD83)	**24 HR.** 16.1
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 9/20/06	**COMPLETED** 9/21/06	**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
179.2					Continued from previous page				
									177.9 — 76.1 Boring and coring terminated at 76.1 ft in Weathered Rock: Severely weathered, medium hard, BIOTITE-QUARTZ GNEISS

GEOTECHNICAL CORING LOG

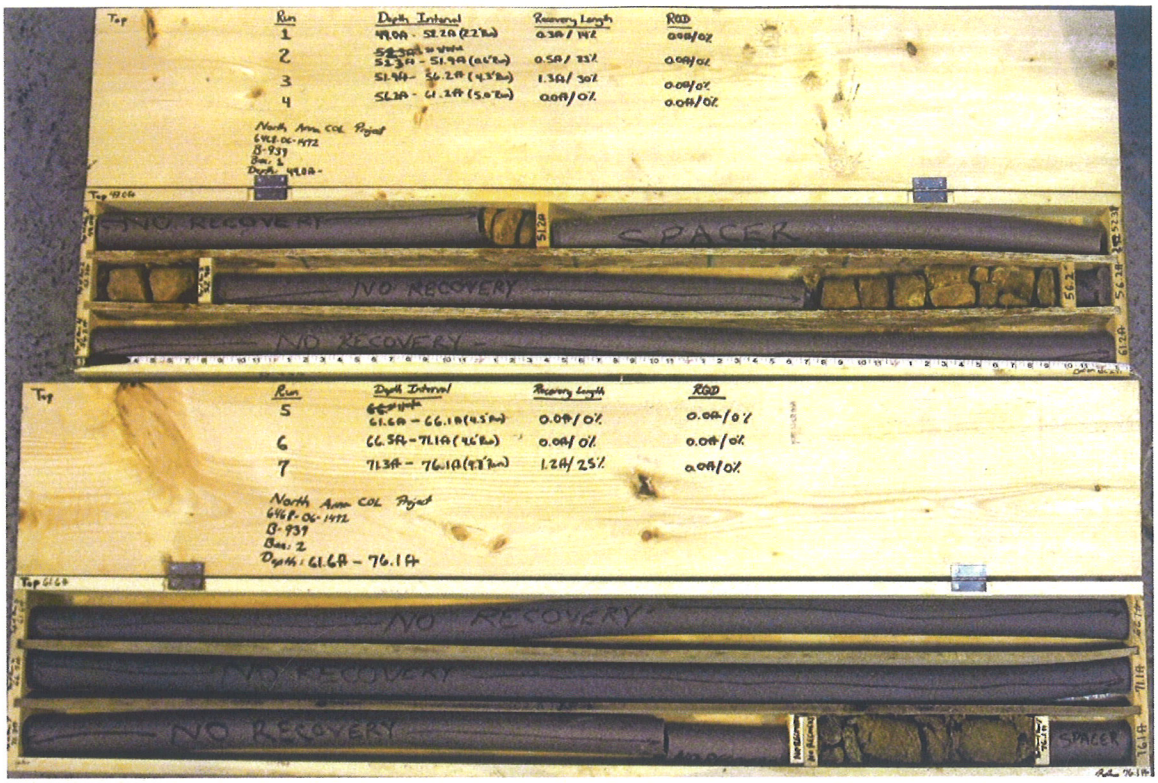
MACTEC

SHEET 1 OF 1

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S. Nicely	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-939	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 17.8
COLLAR ELEV. 254.0 ft **(NAVD88)**	**NORTHING** 3,911,318 **US ft (NAD83)**	**EASTING** 11,686,606 **US ft (NAD83)**	**24 HR.** 16.1
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 9/20/06	**COMPLETED** 9/21/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 26.0 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 @ 49.0 ft
205.0 202.8	49.0 51.2	2.2	2:02 2:30/1.2	(0.3) 14%	(0.0) 0%	1				Weathered Rock: Yellowish brown (10YR 5/8&5/6), light brownish red and reddish brown, severely weathered, very close to close fracturing, soft to medium hard, BIOTITE-QUARTZ GNEISS *(continued)* -Highly fractured and weathered throughout run
202.7 202.1	51.3 51.9	0.6 4.3	*N=50/0.1* 17:13/0.6 3:17/1.3	(0.5) 83%	(0.0) 0%	*939-14* 2 3				-Lense of Hard Rock: Light gray with reddish brown, moderately weathered, very close to close fracturing, hard, BIOTITE-QUARTZ GNEISS from 51.3-51.8 ft
197.8	56.2		5:43 4:31 3:01	(1.3) 30%	(0.0) 0%					-Highly fractured and weathered throughout run with vertical fractures
192.8	61.2	5.0	1:21 0:48 0:44 0:56 0:52	(0.0) 0%	(0.0) 0%	4				-No Recovery
192.4 187.9	61.6 66.1	4.5	*N=50/0.4* 1:27 1:47 1:56 2:26/1.5	(0.0) 0%	(0.0) 0%	*939-15* 5				-No Recovery
187.5 182.9	66.5 71.1	4.6	*N=50/0.4* 2:16 1:44 0:49 2:31/1.6	(0.0) 0%	(0.0) 0%	*939-16* 6				-No Recovery
182.7 177.9	71.3 76.1	4.8	*N=50/0.2* 1:45 1:46 2:40 2:27 3:00/0.8	(1.2) 25%	(0.0) 0%	*939-17* 7				-Highly fractured and weathered throughout run 177.9 76.1 Coring terminated at 76.1 ft in Weathered Rock: Severely weathered, medium hard, BIOTITE-QUARTZ GNEISS

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



B-939 – Box 1
B-939 – Box 2

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-940	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 15.9
COLLAR ELEV. 268.3 ft **(NAVD88)**	**NORTHING** 3,910,267 **US ft (NAD83)**	**EASTING** 11,688,901 **US ft (NAD83)**	**24 HR.** ND
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/2/06	**COMPLETED** 11/3/06	**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
268.3					Ground Surface				268.3 — 0.0
									No samples due to utility clearance operations-soft dig/vac. truck excavation
260.5	7.8								260.5 — 7.8
		14	28	40	68	940-1			Silty, fine to coarse SAND (SM) olive brown (2.5Y 4/3) and light olive brown (2.5Y 5/4), dry to moist, dense and very dense (Residual Soil)
257.3	11.0								
		11	15	22	37	940-2			
254.5	13.8								
		15	19	30	49	940-3	▽		
249.8	18.5								249.8 — 18.5
		50/0.0				940-4			Hard Rock: dark gray, moderately weathered, very close to close fracturing, hard to soft, QUARTZ-BIOTITE GNEISS — 247.1 — 21.2
									Weathered Rock: Dark brown and dark gray, severely weathered, very close to close fracturing, medium hard to very soft, QUARTZ-BIOTITE GNEISS
242.1	26.2								
		34	50	41	91	940-5			
237.1	31.2								
		27	37	50/0.4		940-6			234.7 — 33.6
									Hard Rock: Dark brown to light gray, moderately severe to moderately weathered, very close to close fracturing, soft to medium hard, QUARTZ-BIOTITE GNEISS — 232.2 — 36.1
									Weathered Rock: Dark gray, severely weathered, very close to close fracturing, very soft to medium hard, QUART-BIOTITE GNEISS — 228.2 — 40.1
									Hard Rock: Dark brown and dark to light gray, moderately severe to slightly weathered, very close to moderately close fracturing, soft to very hard, QUARTZ-BIOTITE GNEISS to 56.2 ft then BIOTITE-QUARTZ GNEISS
									202.1 — 66.2
									Hard Rock: Light gray, very slightly weathered to fresh, very close to moderately close fracturing, hard to very hard, BIOTITE-QUARTZ GNEISS

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

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-940	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 15.9
COLLAR ELEV. 268.3 ft (NAVD88)	**NORTHING** 3,910,267 US ft (NAD83) **EASTING** 11,688,901 US ft (NAD83)	**24 HR.** ND
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/2/06	**COMPLETED** 11/3/06	**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
193.5					Continued from previous page				
									192.2 / 76.1 Boring and coring terminated at 76.1 ft in Hard Rock: Hard to very hard, BIOTITE-QUARTZ GNEISS

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

GEOTECHNICAL CORING LOG

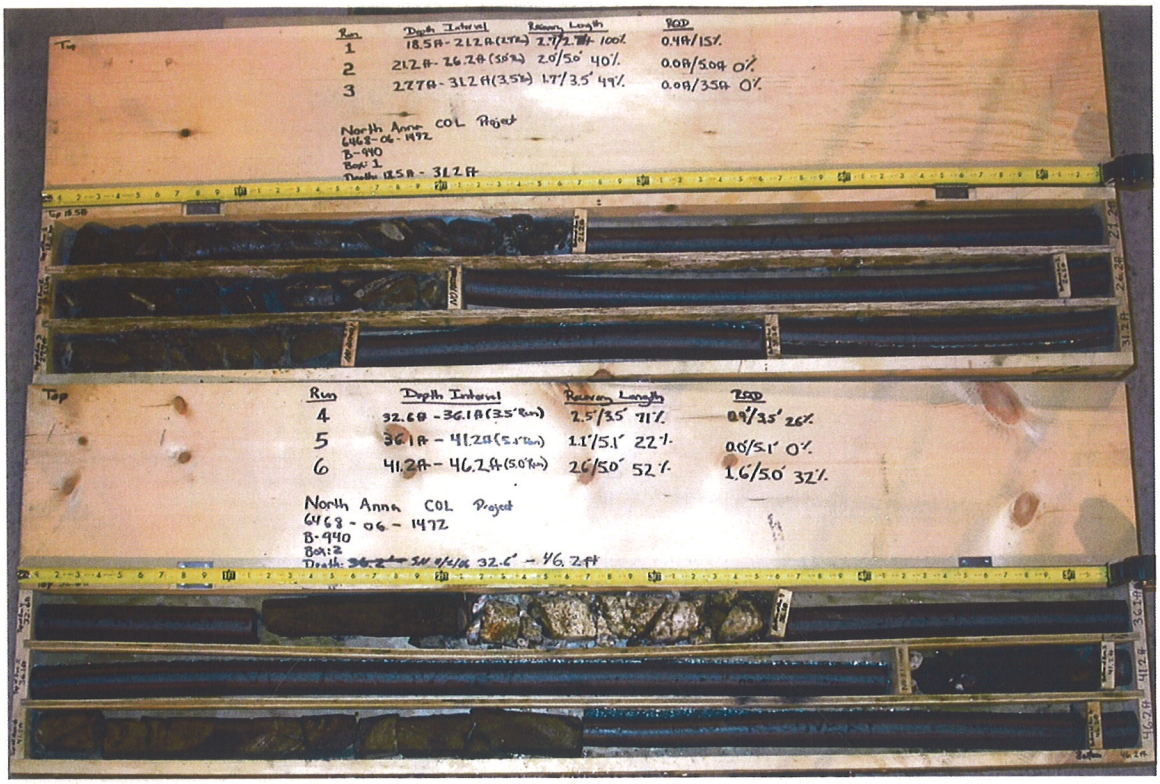
MACTEC

SHEET 1 OF 1

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S. Nicely	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-940	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 15.9
COLLAR ELEV. 268.3 ft **(NAVD88)**	**NORTHING** 3,910,267 **US ft (NAD83)**	**EASTING** 11,688,901 **US ft (NAD83)**	**24 HR.** ND
TOTAL DEPTH 76.1 ft	**DRILL MACHINE** CME 55 Truck	**DRILLER:** H. Meyerson	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/2/06	**COMPLETED** 11/3/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 54.7 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 @ 18.5 ft
249.8	18.5	2.7	N=50/0.0 3:24 6:27	(2.7) 100%	(0.4) 15%	1				249.8 Hard Rock: dark gray, moderately weathered, very close to close fracturing, hard to soft, QUARTZ-BIOTITE GNEISS 18.5
247.1	21.2	5.0	3:15/0.7 3:10 2:59 1:37 1:13 1:23	(2.0) 40%	(0.0) 0%	2				247.1 -Highly fractured with Fe and Mn staining, quartz vein at 20.3 ft 21.2 Weathered Rock: Dark brown and dark gray, severely weathered, very close to close fracturing, medium hard to very soft, QUARTZ-BIOTITE GNEISS -No recovery 23.2-26.2 ft
242.1	26.2		N=91			940-5				
240.6	27.7	3.5	4:18 1:50 1:34	(1.7) 49%	(0.0) 0%	3				-Highly fractured, no recovery from 27.7-31.2 ft
237.1	31.2		0:42/0.5 N=50/0.4			940-6				
235.7	32.6	3.5	3:31 1:53 2:17/1.5	(2.5) 71%	(0.9) 26%	4				234.7 -Highly fractured quartz vein from 34.7-36.1 ft 33.6 Hard Rock: Dark brown to light gray, moderately severe to moderately weathered, very close to close fracturing, soft to medium hard, 232.2 QUARTZ-BIOTITE GNEISS 36.1
232.2	36.1									
227.1	41.2	5.1	1:57 4:31 2:30 3:30 3:33/1.1	(1.1) 22%	(0.0) 0%	5				Weathered Rock: Dark gray, severely weathered, very close to close fracturing, very soft to medium hard, QUART-BIOTITE GNEISS 228.2 -Quartz vein from 36.1-36.2 ft, no recovery from 36.2-40.1 ft 40.1
222.1	46.2	5.0	2:29 3:06 2:41 3:16 3:11	(2.6) 52%	(1.6) 32%	6				Hard Rock: Dark brown and dark to light gray, moderately severe to slightly weathered, very close to moderately close fracturing, soft to very hard, QUARTZ-BIOTITE GNEISS to 56.2 ft then BIOTITE-QUARTZ GNEISS -Highly fractured, no recovery from 43.8-46.2 ft
217.1	51.2	5.0	3:24 3:09 1:59 2:44 1:51	(4.2) 84%	(0.0) 0%	7				-Highly fractured; quartz vein at 49.6 ft and from 48.6-49.4 ft
212.1	56.2	5.0	1:23 1:48 2:11 2:02 2:29	(4.1) 82%	(1.7) 34%	8				-Highly fractured; quartz vein from 54.2-54.4 ft
207.1	61.2	5.0	2:38 3:38 3:42 3:37 3:43	(4.8) 96%	(4.1) 82%	9				(5 joints at 60-65°)
202.1	66.2	5.0	1:46 1:17 1:16 1:27 2:49	(2.7) 54%	(1.9) 38%	10				(2 joints at 10° with Fe staining; 1 joint at 50°; no recovery from 61.2-63.5 ft) 202.1 66.2
197.2	71.1	4.9	2:34 3:42 3:38 4:17 3:58/0.9	(4.9) 100%	(4.7) 96%	11				Hard Rock: Light gray, very slightly weathered to fresh, very close to moderately close fracturing, hard to very hard, BIOTITE-QUARTZ GNEISS (2 joints at 40°; 1 joint at 70° with Fe staining and unknown radiating mineral)
192.2	76.1	5.0	3:12 3:15 3:12 3:31 3:02	(5.0) 100%	(4.2) 84%	12				(1 joint at 45°, 1 joint at 75°) 192.2 76.1 Coring terminated at 76.1 ft in Hard Rock: Hard to very hard, BIOTITE-QUARTZ GNEISS

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



B-940 – Box 1
B-940 – Box 2

B-940 – Box 3
B-940 – Box 4

GEOTECHNICAL BORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Lachewitz / J. Wallen
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-941	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** ND
COLLAR ELEV. 267.2 ft (NAVD88)	**NORTHING** 3,910,404 US ft (NAD83)	**EASTING** 11,688,913 US ft (NAD83) — **24 HR.** 11.0
TOTAL DEPTH 75.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/1/06	**COMPLETED** 11/2/06	**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
267.2					Ground Surface				267.2 — 0.0 No samples due to utility clearance operations- soft dig/ vac. truck excavation
258.7	8.5								258.7 — 8.5
256.2	11.0	16	33	40	73	941-1			Silty, fine to medium SAND (SM) light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6), moist, dense to very dense, relict rock fabric (Residual Soil)
252.8	14.4	17	42	50	92	941-2			
247.8	19.4	22	20	21	41	941-3			
242.8	24.4	33	32	50	82	941-4			
237.8	29.4	16	50/0.3			941-5			244.2 — 23.0 Weathered Rock: Very dark gray (10YR 3/1) to gray and yellowish brown (yellowish brown (10YR5/6), moist, very dense, severely weathered, very soft to medium hard, BIOTITE-QUARTZ GNEISS
233.7	33.5	26	50/0.2			941-6			
226.1	41.1	50/0.2				941-7			
220.8	46.4	21	50/0.4			941-8			222.2 — 45.0 Silty, fine to medium SAND (SM) very dark brown (10YR 2/2), moist, dense (Residual Soil)
		11	15	33	48	941-9			217.7 — 49.5 Hard Rock: Dark gray, moderately severe to moderately weathered, very close to close fracturing, soft to moderately hard, BIOTITE-QUARTZ GNEISS
									205.8 — 61.4 Hard Rock: Gray, slightly to very slightly weathered, close to moderately close fracturing, hard to very hard, BIOTITE-QUARTZ GNEISS

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

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Lachewitz / J. Wallen	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-941	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** ND
COLLAR ELEV. 267.2 ft **(NAVD88)**	**NORTHING** 3,910,404 **US ft (NAD83)**	**EASTING** 11,688,913 **US ft (NAD83)**	**24 HR.** 11.0
TOTAL DEPTH 75.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/1/06	**COMPLETED** 11/2/06	**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
192.4					Continued from previous page				
191.4	75.8								Boring and coring terminated at 75.8 ft in Hard Rock: Very hard, BIOTITE-QUARTZ GNEISS

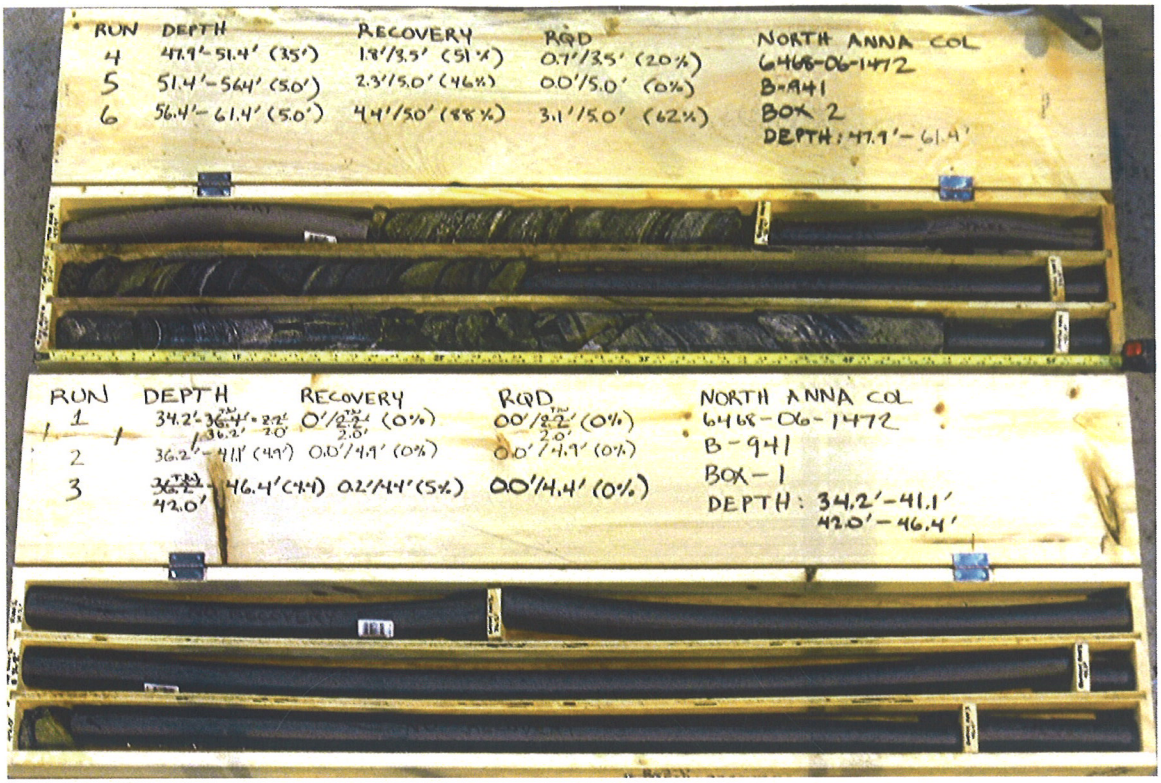
GEOTECHNICAL CORING LOG

MACTEC

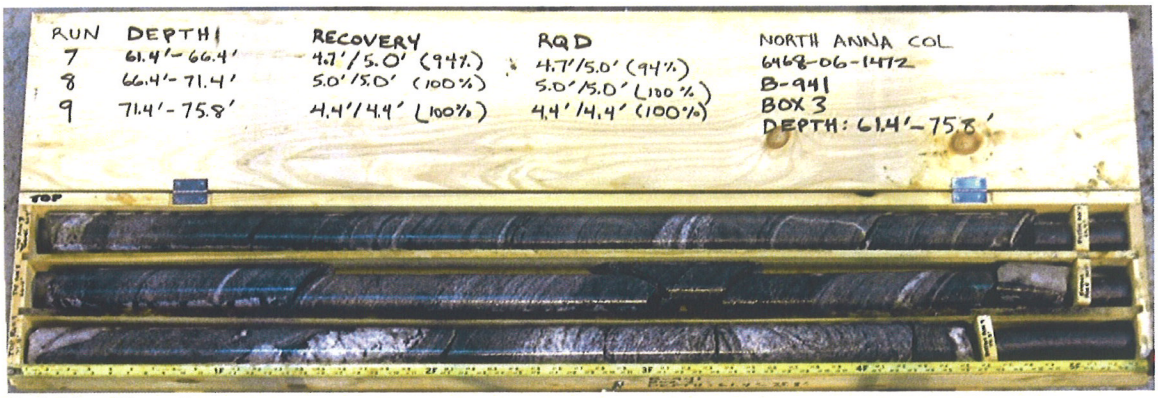
MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** J. Lachewitz / J. Wallen	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-941	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** ND
COLLAR ELEV. 267.2 ft **(NAVD88)**	**NORTHING** 3,910,404 **US ft (NAD83)**	**EASTING** 11,688,913 **US ft (NAD83)**	**24 HR.** 11.0
TOTAL DEPTH 75.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** G. Akins	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 11/1/06	**COMPLETED** 11/2/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 39.2 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 @ 34.2 ft
233.0	34.2	2.0	1:08 1:19	(0.0) 0%	(0.0) 0%	1				Weathered Rock: Very dark gray (10YR 3/1) to gray and yellowish brown (yellowish brown (10YR5/6), moist, very dense, severely weathered, very soft to medium hard, BIOTITE-QUARTZ GNEISS *(continued)*
231.0	36.2	4.9	0:56 1:05 1:16 1:32 1:07/0.9	(0.0) 0%	(0.0) 0%	2				-No Recovery -No Recovery
226.1	41.1		*N=50/0.4*			*941-8*				
225.2	42.0	4.4	2:43/1.1 2:37 2:42 1:48/1.3	(0.2) 5%	(0.0) 0%	3				
222.2										45.0
220.8	46.4		*N=48*			*941-9*				Silty, fine to medium SAND (SM) very dark brown (10YR 2/2), moist, dense (Residual Soil)
219.3	47.9	3.5	2:16 1:40 1:32 0:30/0.5	(1.8) 51%	(0.7) 20%	4				(10 joints at 30°)
217.7										49.5
215.8	51.4	5.0	1:56 1:58 1:54 2:52 2:00	(2.3) 46%	(0.0) 0%	5				Hard Rock: Dark gray, moderately severe to moderately weathered, very close to close fracturing, soft to moderately hard, BIOTITE-QUARTZ GNEISS (11 joints at 30°)
210.8	56.4	5.0	2:16 2:23 3:40 3:02 3:36	(4.4) 88%	(3.1) 62%	6				(5 joints at 20-30°, 2 joints at 50°, 1 joint at 70°)
205.8	61.4									61.4
205.8	61.4	5.0	2:41 2:37 3:07 1:21 1:34	(4.7) 94%	(4.7) 94%	7				Hard Rock: Gray, slightly to very slightly weathered, close to moderately close fracturing, hard to very hard, BIOTITE-QUARTZ GNEISS (5 joints at 30°)
200.8	66.4	5.0	2:14 1:14 1:42 1:46 2:37	(5.0) 100%	(5.0) 100%	8				(3 joints at 40°, 1 joint at 70°, Quartz vein at 80° from 71.1-71.4 ft)
195.8	71.4	4.4	4:19 4:06 3:17 4:58 3:08/0.4	(4.4) 100%	(4.4) 100%	9				(1 joint at 40°; Quartz veins at 80° from 71.4-71.7 ft and at 50° from 72.4-73.2 ft, trace garnet in and around veins)
191.4	75.8									75.8
										Coring terminated at 75.8 ft in Hard Rock: Very hard, BIOTITE-QUARTZ GNEISS

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



B-941 – Box 2
B-941 – Box 1



B-941 – Box 3

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-942	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 3.2
COLLAR ELEV. 291.9 ft (NAVD88)	**NORTHING** 3,909,615 US ft (NAD83)	**EASTING** 11,684,326 US ft (NAD83)	**24 HR.** 3.8
TOTAL DEPTH 100.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** F. Cox (Knoxville 550)	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 10/16/06	**COMPLETED** 10/18/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	SOIL AND ROCK DESCRIPTION
291.9						Ground Surface
291.9	0.0	5	3	5	942-1	Clayey SILT (MH) dark brown (7.5YR 3/4), moist, medium stiff, contains root fragments (Residual Soil)
289.9	2.0					
288.9	3.0	10	13	13	942-2	Silty, fine to coarse SAND (SM) strong brown (7.5YR 4/6), moist, medium dense to very dense (Residual Soil)
283.8	8.1					
282.3	9.6	28	44	44	942-3	
		36	50/0.5		942-4	
279.9	12.0					
278.9	13.0	12	50/0.5		942-5	
		50/0.5			942-6	
273.4	18.5					
		39	50/0.2		942-7	
268.2	23.7					
		25	46	50/0.3	942-8	
264.1	27.8					
263.2	28.7	50/0.4			942-9	
		50/0.2			942-10	
281.8	10.1					Weathered Rock: Strong brown (7.5YR 4/6), dark yellowish brown (10YR 4/4), and very dark grayish brown (10YR 3/2), moist, very dense, severely weathered, QUARTZ-BIOTITE GNEISS
263.0	28.9					
261.1	30.8					Hard Rock: Dark gray, slightly weathered, close fracturing, very hard, QUARTZ-BIOTITE GNEISS
						Hard Rock: Dark gray, fresh, wide to very wide fracturing, very hard, QUARTZ-BIOTITE GNEISS with trace pyrite

BLOWS PER FOOT: 0 20 40 60 80 100

MOI

LOG

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

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S. Nicely
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**
BORING NO. B-942	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE — **0 HR.** 3.2
COLLAR ELEV. 291.9 ft (NAVD88)	**NORTHING** 3,909,615 US ft (NAD83)	**EASTING** 11,684,326 US ft (NAD83) — **24 HR.** 3.8
TOTAL DEPTH 100.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** F. Cox (Knoxville 550) — **HAMMER TYPE** 140 lbs Auto
DATE STARTED 10/16/06	**COMPLETED** 10/18/06	**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
217.0					Continued from previous page				
									Hard Rock: Dark gray, fresh, wide to very wide fracturing, very hard, QUARTZ-BIOTITE GNEISS with trace pyrite *(continued)*
191.1	100.8								Boring and coring terminated at 100.8 ft in Hard Rock: Very hard, QUARTZ-BIOTITE GNEISS

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

GEOTECHNICAL CORING LOG

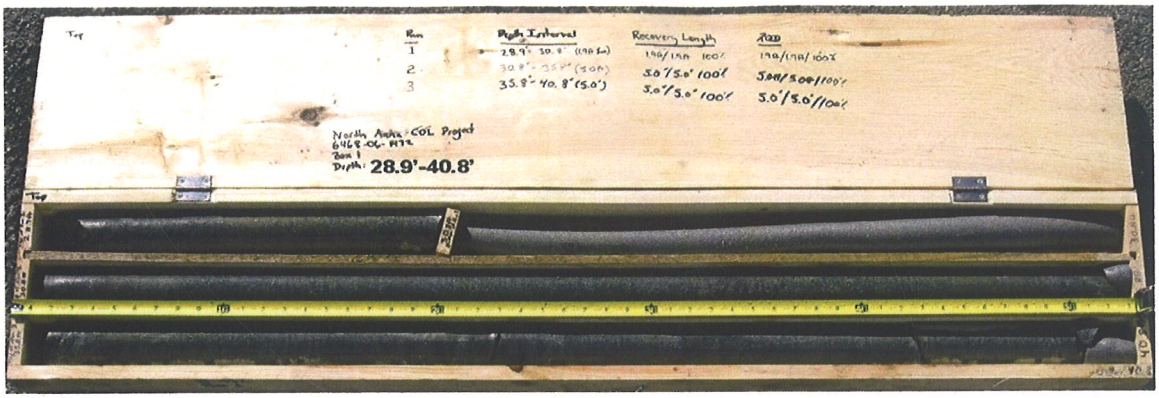
MACTEC

SHEET 1 OF 1

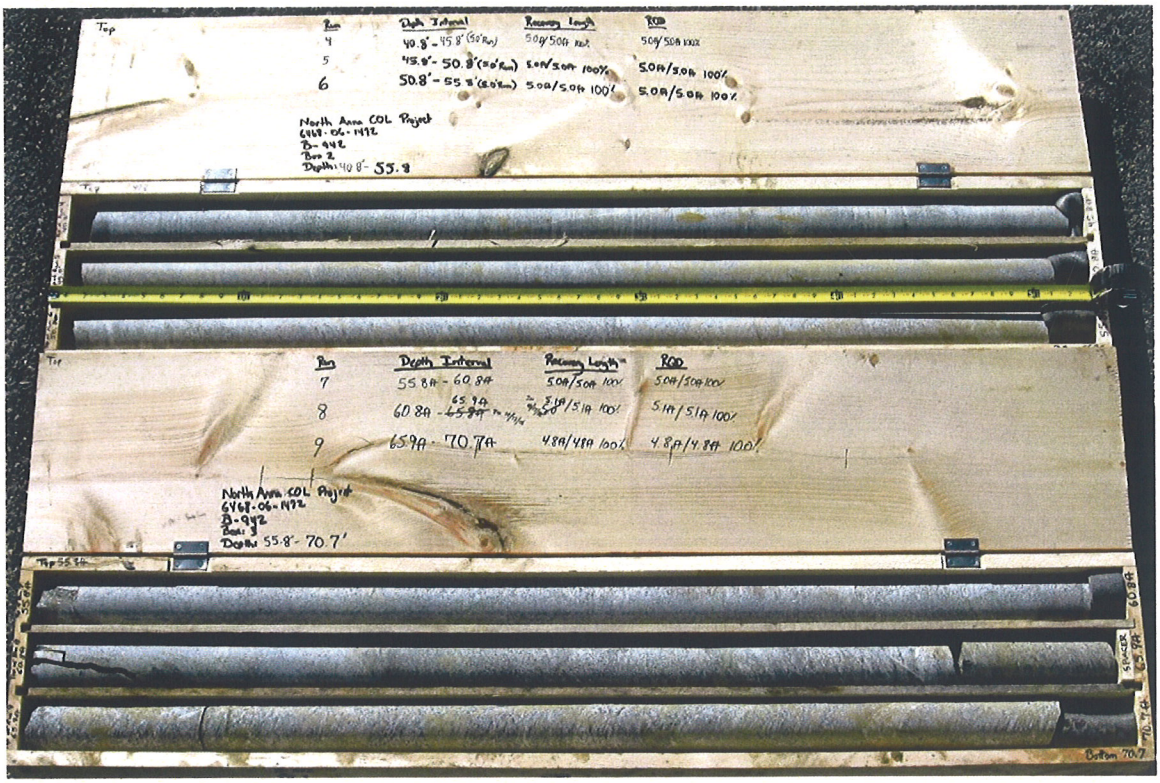
MACTEC PROJECT NO.: 6468-06-1472		**COUNTY** Louisa, VA	**GEOLOGIST** S. Nicely
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-942	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 3.2
COLLAR ELEV. 291.9 ft **(NAVD88)**	**NORTHING** 3,909,615 **US ft (NAD83)**	**EASTING** 11,684,326 **US ft (NAD83)**	**24 HR.** 3.8
TOTAL DEPTH 100.8 ft	**DRILL MACHINE** CME 550 ATV	**DRILLER:** F. Cox (Knoxville 550)	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 10/16/06	**COMPLETED** 10/18/06	**CORE BARREL TYPE:** HQ 3 triple tube-wireline	
CORE SIZE HQ3	**TOTAL RUN** 71.9 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 @ 28.9 ft
263.0	28.9	1.9	2:58	(1.9)	(1.9)	1			263.0	Hard Rock: Dark gray, slightly weathered, close fracturing, very hard, 28.9
261.1	30.8		7:11/0.9	100%	100%				261.1	QUARTZ-BIOTITE GNEISS 30.8
		5.0	4:48	(5.0)	(5.0)	2				Hard Rock: Dark gray, fresh, wide to very wide fracturing, very hard, QUARTZ-BIOTITE GNEISS with trace pyrite
			3:08	100%	100%					-No Joints
			3:25							
			3:06							
256.1	35.8		3:16							
		5.0	3:02	(5.0)	(5.0)	3				-No Joints
			3:12	100%	100%					
			2:52							
			3:00							
251.1	40.8		2:59							
		5.0	2:57	(5.0)	(5.0)	4				-No Joints
			2:58	100%	100%					
			2:25							
			2:55							
246.1	45.8		2:52							
		5.0	2:11	(5.0)	(5.0)	5				-No Joints
			2:37	100%	100%					
			2:43							
			2:06							
241.1	50.8		2:37							
		5.0	2:40	(5.0)	(5.0)	6				-No Joints
			2:50	100%	100%					
			2:47							
			2:15							
236.1	55.8		2:54							
		5.0	2:57	(5.0)	(5.0)	7				-No Joints
			3:17	100%	100%					
			2:41							
			2:34							
231.1	60.8		2:50							
		5.1	2:53	(5.1)	(5.1)	8				-No Joints
			2:45	100%	100%					
			2:58							
			3:02							
226.0	65.9		2:53/1.1							
		4.8	2:52	(4.8)	(4.8)	9				-No Joints
			3:23	100%	100%					
			3:27							
			2:37							
221.2	70.7		2:44/0.8							
		5.0	3:28	(5.0)	(5.0)	10				(1 joint at 25°)
			2:59	100%	100%					
			3:29							
			2:58							
216.2	75.7		3:26							
		5.0	2:39	(5.0)	(5.0)	11				-No Joints
			2:53	100%	100%					
			2:42							
			2:40							
211.2	80.7		2:53							
		5.1	2:26	(5.1)	(5.1)	12				-No Joints
			2:29	100%	100%					
			2:27							
			2:46							
206.1	85.8		2:50/1.1							
		5.0	2:28	(5.0)	(5.0)	13				(1 joint at 20°)
			2:24	100%	100%					
			2:56							
			2:44							
201.1	90.8		1:57							
		5.0	2:18	(5.0)	(5.0)	14				-No Joints
			2:11	100%	100%					
			2:04							
			2:27							
196.1	95.8		2:32							
		5.0	2:20	(5.0)	(5.0)	15				-No Joints
			2:27	100%	100%					
			2:24							
			2:47							
191.1	100.8		2:37						191.1	100.8
										Coring terminated at 100.8 ft in Hard Rock: Very hard, QUARTZ-BIOTITE GNEISS

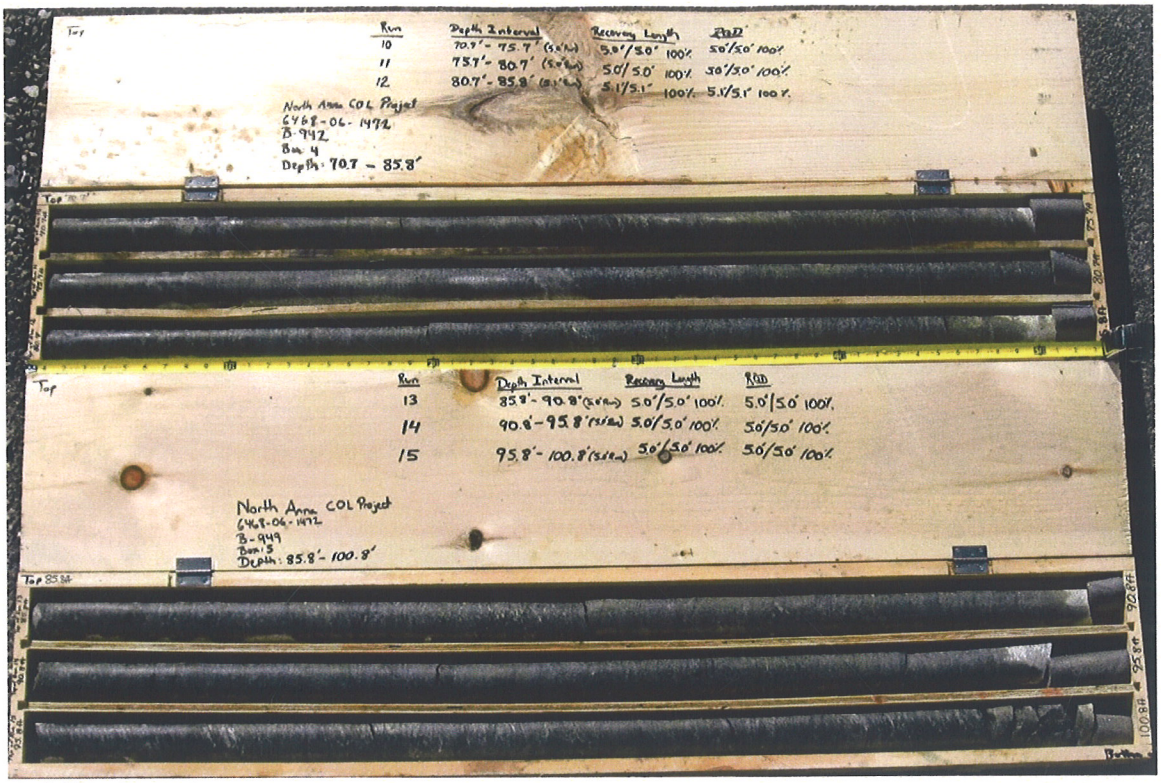
NORTH ANNA COL CORE NORTH ANNA COL DATA REPORT REV0.GPJ NORTH ANNA COL.GDT 1/19/07



B-942 – Box 1



B-942 – Box 2
B-942 – Box 3



B-942 – Box 4
B-942 – Box 5