GEOTECHNICAL BORING LOG

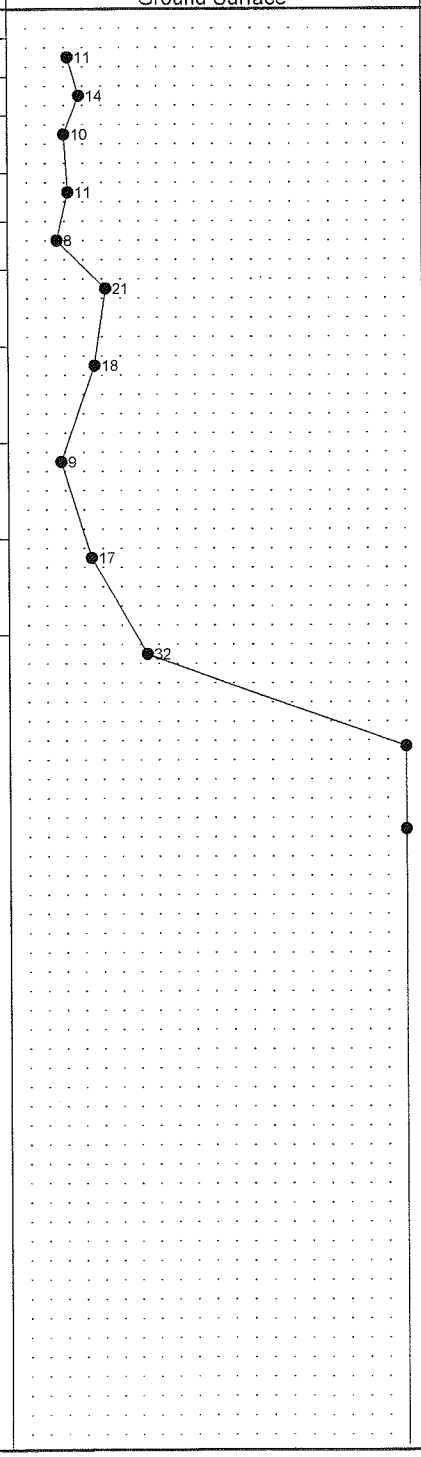
MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST S.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-907	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE
COLLAR ELEV. 322.7 ft (NAVD88)	NORTHING 3,909,608 US ft (NAD83)	EASTING 11,685,938 US ft (NAD83)
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 45 Trailer	DRILLER: F. Cox
DATE STARTED 8/1/06	COMPLETED 8/9/06	CORE BARREL TYPE: HQ split inner barrel

GROUND WATER (ft)	
0 HR.	28.1
24 HR.	28.4

HAMMER TYPE 140 lbs Auto

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
322.7								Ground Surface	322.7 / 0.0
321.2	1.5							CLAY (CL) sandy, silty, strong brown (7.5YR 5/6) dry to moist, stiff (Residual Soil)	320.2 / 2.5
319.2	3.5	2	4	7	907-1			Silty, fine to coarse SAND (SM), strong brown (7.5YR 5/6), dry, medium dense (Residual Soil)	
317.2	5.5	7	6	8	907-2				
314.2	8.5	3	5	5	907-3				
311.7	11.0	4	5	6	907-4				312.2 / 10.5
309.2	13.5	2	3	5	907-5			Silty, fine to coarse SAND (SM), light yellowish brown (2.5Y 6/4), moist, loose to medium dense (Residual Soil)	
305.2	17.5	6	10	11	907-6				306.7 / 16.0
300.2	22.5	7	9	9	907-7			Silty, fine to coarse SAND (SM) light yellowish brown (2.5Y 6/4), dry to moist, medium dense (Residual Soil)	301.7 / 21.0
295.2	27.5	3	4	5	907-8			Silty SAND (SM) yellowish brown (10YR 5/6), moist, loose to dense, micaceous, saprolitic (Residual Soil)	
290.2	32.5	3	8	9	907-9	▼			
285.2	37.5	6	11	21	907-10				286.7 / 36.0
280.2	42.5	41	50/0.3		907-11			Weathered Rock: Dark yellowish brown (10YR 4/6) and light olive brown (2.5Y 5/3), moist, very dense, severely weathered, QUARTZ-BIOTITE GNEISS	280.1 / 42.6
		50/0.1			907-12			Hard Rock: Light to dark gray with orange Fe staining, moderately severe to moderately weathered, close to moderately close fracturing, medium to moderately hard, QUARTZ-BIOTITE GNEISS	
									252.2 / 70.5



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.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-907	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE	0 HR. 28.1
COLLAR ELEV. 322.7 ft (NAVD88)	NORTHING 3,909,608 US ft (NAD83)	EASTING 11,685,938 US ft (NAD83)	24 HR. 28.4
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 45 Trailer	DRILLER: F. Cox	HAMMER TYPE 140 lbs Auto
DATE STARTED 8/1/06	COMPLETED 8/9/06	CORE BARREL TYPE: HQ split inner barrel	

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
247.9					Continued from previous page				
247.2	75.5	50/0.4				907-13			Hard Rock-Weathered Rock: Light to dark gray with orange Fe staining, severely to slightly weathered, very close to close fracturing, soft to moderately hard, QUARTZ-BIOTITE GNEISS *(continued)*
242.2	80.5	50/0.2				907-14			
									207.2 — 115.5 Hard Rock: Light gray to dark gray and light pink, slightly weathered to fresh, close to wide fracturing, hard to very hard, QUARTZ-BIOTITE GNEISS

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.Lehman
SITE DESCRIPTION NORTH ANNA COL		GROUND WATER (ft)
BORING NO. B-907	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE	0 HR. 28.1
COLLAR ELEV. 322.7 ft (NAVD88)	NORTHING 3,909,608 US ft (NAD83)	EASTING 11,685,938 US ft (NAD83)	24 HR. 28.4
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 45 Trailer	DRILLER: F. Cox	HAMMER TYPE 140 lbs Auto
DATE STARTED 8/1/06	COMPLETED 8/9/06	CORE BARREL TYPE: HQ split inner barrel	

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
173.1					Continued from previous page				
									Hard Rock: Light gray to dark gray and light pink, slightly weathered to fresh, close to wide fracturing, hard to very hard, QUARTZ-BIOTITE GNEISS *(continued)*
									122.2
									Boring and coring terminated at 200.5 ft in Hard Rock: Very hard, QUARTZ-BIOTITE GNEISS
									200.5

GEOTECHNICAL CORING LOG

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S.Lehman	
SITE DESCRIPTION NORTH ANNA COL		**GROUND WATER (ft)**	
BORING NO. B-907	**DRILL METHOD:** Mud Rotary/Core	**SAMPLE METHODS:** SPT/CORE	**0 HR.** 28.1
COLLAR ELEV. 322.7 ft (NAVD88)	**NORTHING** 3,909,608 US ft (NAD83)	**EASTING** 11,685,938 US ft (NAD83)	**24 HR.** 28.4
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 45 Trailer	**DRILLER:** F. Cox	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/1/06	**COMPLETED** 8/9/06	**CORE BARREL TYPE:** HQ split inner barrel	
CORE SIZE HQ	**TOTAL RUN** 157.4 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 @ 42.5 ft
280.2	42.5	3.0	N=50/0.1 2:00 2:26 2:12	(2.7) 90%	(1.4) 47%	1				280.1 — 42.6 Weathered Rock: Dark yellowish brown (10YR 4/6) and light olive brown (2.5Y 5/3), moist, very dense, severely weathered, QUARTZ-BIOTITE GNEISS *(continued)* (1 joint at 35° with clay, Fe stain; 1 joint at 10° with Fe stain)
277.2	45.5									
272.2	50.5	5.0	2:03 2:19 2:35 2:32 2:26	(4.9) 98%	(4.4) 88%	2				Hard Rock: Light to dark gray with orange Fe staining, moderately severe to moderately weathered, close to moderately close fracturing, medium to moderately hard, QUARTZ-BIOTITE GNEISS (2 joints at 35°, 2 joints at 10-20°, 1 joint at 80-90°) (1 joint at 30°, 1 joint at 0-5°)
267.2	55.5	5.0	2:27 2:13 2:16 2:15 2:12	(4.5) 90%	(3.9) 78%	UC-51.9'				
262.2	60.5	5.0	2:04 1:26 1:21 1:05 1:12	(5.0) 100%	(4.1) 82%	4				(1 joint at 35°, 2 joints at 0-5°)
257.2	65.5	5.0	1:40 1:33 1:10 1:30 1:22	(3.3) 66%	(2.1) 42%	5				(4 joints at 0-5°)
252.2	70.5	5.0	1:32 1:398 1:29 1:26 1:32	(4.7) 94%	(4.1) 82%	6				(3 joints at 65° with trace clay)
248.9	73.8	3.3	1:04 1:07 1:44 0:46/0.3	(0.2) 6%	(0.0) 0%	7				252.2 — 70.5 Hard Rock-Weathered Rock: Light to dark gray with orange Fe staining, severely to slightly weathered, very close to close fracturing, soft to moderately hard, QUARTZ-BIOTITE GNEISS (1 joint at 70° with Fe stain)
247.2	75.5	1.7	0:49/0.7 0:52	(0.0) 0%	(0.0) 0%	8				-No Recovery
246.8	75.9	4.6	N=50/0.4 0:56 0:53 1:34 1:42	(0.0) 0%	(0.0) 0%	907-13 9				-No Recovery
242.2	80.5									
242.0	80.7	1.9	1:14/0.6	(0.6) 32%	(0.0) 0%	907-14				(2 joints at 55° with trace clay and Fe stain)
240.1	82.6		N=50/0.2			10				
237.2	85.5	2.9	4:15 4:04/0.9 2:16/0.9	(1.4) 48%	(0.0) 0%	11				(3 joints at 45° and 2 joints at 65° with Fe stain)
232.2	90.5	5.0	2:04 1:19 2:27 2:17 2:55 2:51	(3.5) 70%	(2.3) 46%	UC-90.0'				(4 joints at 10° with Fe stain; 2 joints at 65° with trace clay and Fe stain)
230.9	91.8	1.3	2:06 4:20	(0.0) 0%	(0.0) 0%	13				-No Recovery
227.2	95.5	3.7	1:16/0.3 2:28/0.7 3:59 2:20	(3.3) 89%	(0.9) 24%	14				(4 joints at 10° with Fe stain)
225.6	97.1	1.6	2:30 4:12	(1.4) 88%	(0.5) 31%	15				(3 joints at 35° with Fe stain)
222.2	100.5	3.4	3:08/0.6 3:34/0.4 4:16 1:45	(2.1) 62%	(0.6) 18%	16				(2 joints at 25°, 1 joint at 75°)
221.2	101.5	1.0	3:19	(0.4) 40%	(0.0) 0%	17				
218.2	104.5	3.0	6:31 5:43 1:45	(1.0) 33%	(0.0) 0%	18				
217.2	105.5	1.0	3:42	(0.4) 40%	(0.4) 40%	19				
213.9	108.8	3.3	4:34 6:10 4:31 1:00	(0.0) 0%	(0.0) 0%	20				-No Recovery
212.2	110.5	1.7	0:18/0.3 3:26/0.7	(0.6) 35%	(0.0) 0%	21				
210.9	111.8	1.3	6:58	(0.0) 0%	(0.0) 0%	22				-No Recovery
207.2	115.5	3.7	6:17 3:40/0.3 3:30/0.7 3:28	(3.3) 89%	(1.7) 46%	23				(2 joints at 10°, 1 joint at 25°, 2 joints at 45°) 207.2 — 115.5
		5.0	3:10 4:19	(5.0)	(4.0)	UC-116.8'				(5 joints at 35-45° and 1 joint at 55° with Fe stain)

MACTEC

MACTEC PROJECT NO.: 6468-06-1472	COUNTY Louisa, VA	GEOLOGIST S.Lehman	
SITE DESCRIPTION NORTH ANNA COL			GROUND WATER (ft)
BORING NO. B-907	DRILL METHOD: Mud Rotary/Core	SAMPLE METHODS: SPT/CORE	0 HR. 28.1
COLLAR ELEV. 322.7 ft (NAVD88)	NORTHING 3,909,608 US ft (NAD83)	EASTING 11,685,938 US ft (NAD83)	24 HR. 28.4
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 45 Trailer	DRILLER: F. Cox	HAMMER TYPE 140 lbs Auto
DATE STARTED 8/1/06	COMPLETED 8/9/06	CORE BARREL TYPE: HQ split inner barrel	
CORE SIZE HQ	TOTAL RUN 157.4 ft		

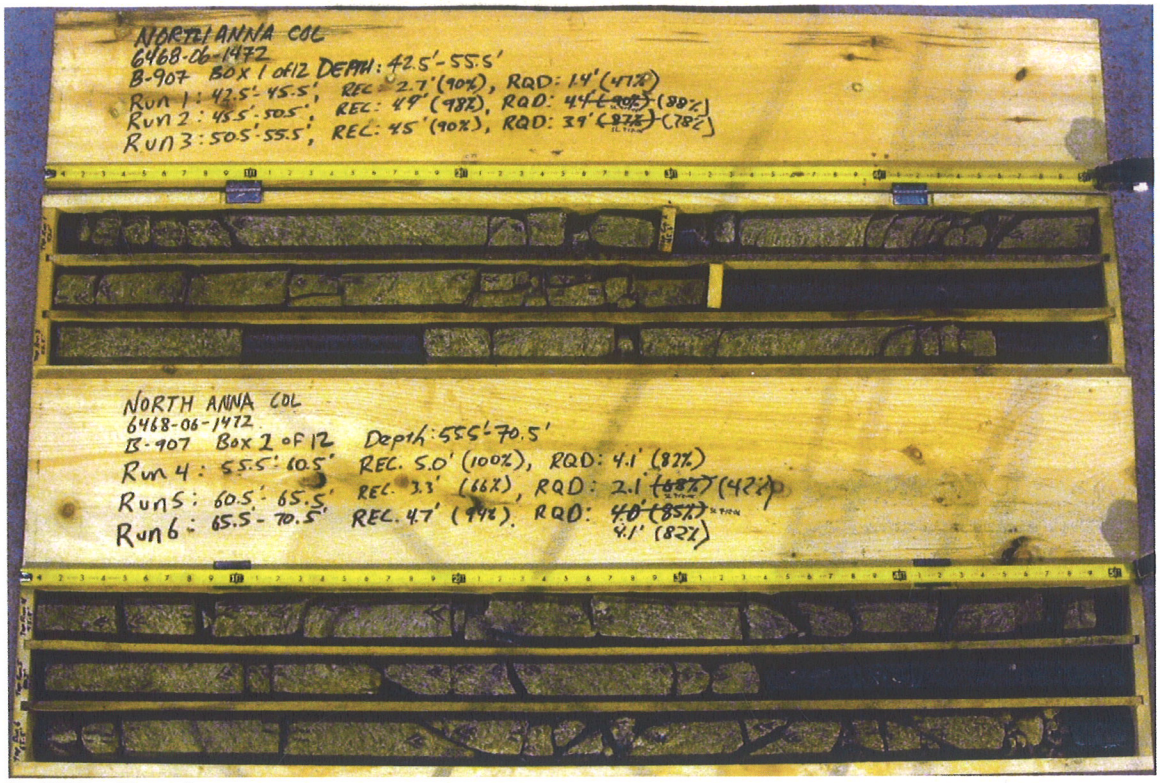
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
										Continued from previous page
202.2	120.5		3:27 2:54 2:58 2:47	100%	80%					Hard Rock: Light gray to dark gray and light pink, slightly weathered to fresh, close to wide fracturing, hard to very hard, QUARTZ-BIOTITE GNEISS *(continued)*
197.2	125.5	5.0	3:22 3:59 3:46 3:34 3:37	(5.0) 100%	(4.5) 90%	25				(4 joints at 40°)
192.2	130.5	5.0	3:21 3:35 2:45 2:33 2:19 1:52	(4.9) 98%	(4.6) 92%	26				(1 joint at 40°; 1 joint at 20° moderately weathered, Fe stain)
187.2	135.5	5.0	2:09 2:09 2:18 2:19 2:26	(4.9) 98%	(4.0) 80%	UC-131.8'				(1 joint at 60°, 1 joint at 40°, 1 joint at 20°)
182.2	140.5	5.0	2:15 2:16 2:26 2:35 2:48	(5.0) 100%	(4.0) 80%	28				(4 joints at 60°, trace clay)
177.2	145.5	5.0	2:32 2:04 2:07 2:42 2:40	(5.0) 100%	(4.3) 86%	29				(4 joints at 50° with clay to trace clay; 1 joint at 20° with trace clay)
172.2	150.5	5.0	2:35 2:22 3:24 4:07 4:25	(4.9) 98%	(4.6) 92%	30				(3 joints at 45° with trace clay; 2 joints at 20°)
167.2	155.5	5.0	5:09 5:19 5:15 5:07 4:40	(5.0) 100%	(4.8) 96%	31				(2 joints at 45° with weathering; 1 joint at 20° with trace clay)
162.2	160.5	5.0	3:23 2:47 3:19 3:54 3:50	(5.0) 100%	(4.7) 94%	32				(1 joint at 20° with moderate Fe staining)
157.2	165.5	5.0	3:39 3:12 2:46 3:39 4:06	(4.9) 98%	(4.9) 98%	UCS-160.8'				(3 joints at 45° with Fe stain; 1 joint at 70° with trace clay and Fe stain)
152.2	170.5	5.0	4:45 5:06 4:39 4:58 5:53	(5.1) 102%	(5.1) 102%	34				(2 joints at 45° with trace clay, slightly weathered; 1 joint at 10° weathered)
147.2	175.5	5.0	6:47 4:11 7:44 7:10 6:43	(5.0) 100%	(4.2) 84%	35				(2 joints at 45° slightly weathered with Fe stain; quartz vein at 60° from 171.4-171.8 ft)
142.2	180.5	5.0	7:20 8:15 9:27 11:09 14:50	(4.8) 96%	(4.8) 96%	36				(1 joint at 70° slightly weathered with Fe stain)
137.2	185.5	5.0	13:24 14:35 4:35 4:12 4:52	(5.2) 104%	(3.0) 60%	37				(5 joints at 65° slightly weathered with Fe stain)
132.2	190.5	5.0	3:12 2:43 3:31 3:46 3:22	(5.0) 100%	(5.0) 100%	38				(1 joint at 45° moderately weathered with Fe stain)
		5.0	2:55	(5.0)	(5.0)	39				-No Joints

GEOTECHNICAL CORING LOG

MACTEC

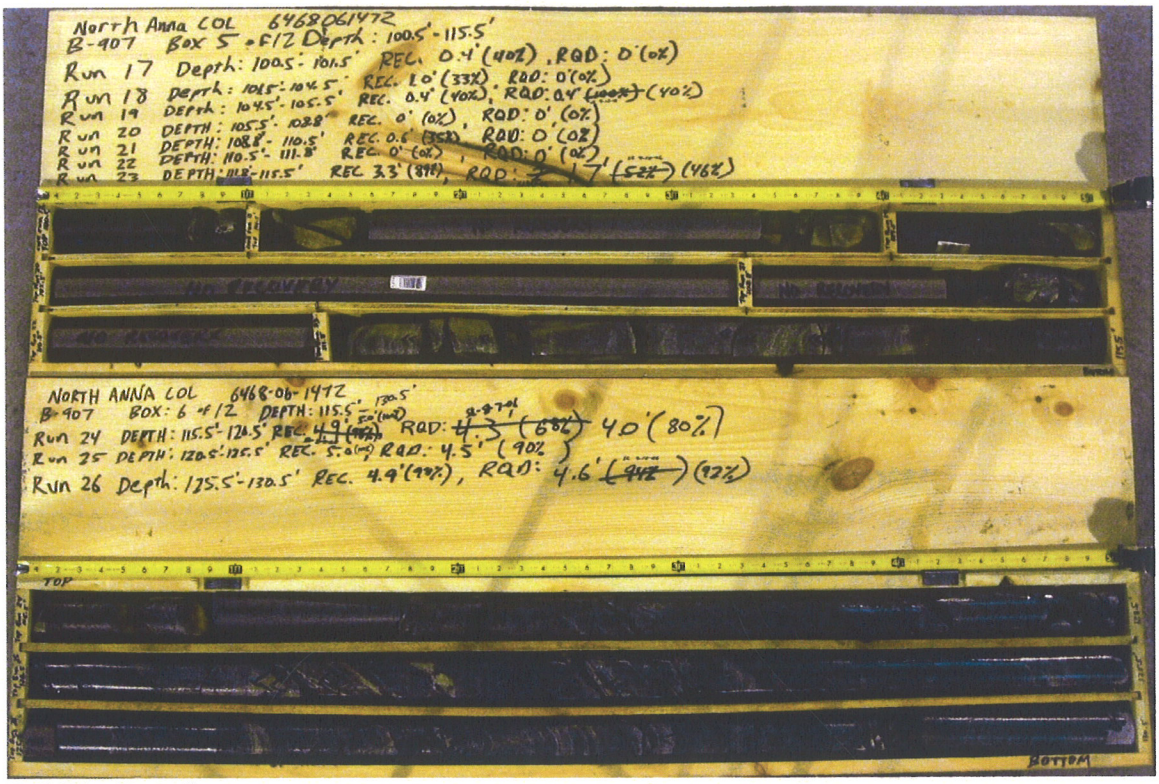
MACTEC PROJECT NO.: 6468-06-1472	**COUNTY** Louisa, VA	**GEOLOGIST** S.Lehman	
SITE DESCRIPTION NORTH ANNA COL			**GROUND WATER (ft)**
BORING NO. B-907	**DRILL METHOD: Mud Rotary/Core**	**SAMPLE METHODS: SPT/CORE**	**0 HR.** 28.1
COLLAR ELEV. 322.7 ft **(NAVD88)**	**NORTHING** 3,909,608 **US ft (NAD83)**	**EASTING** 11,685,938 **US ft (NAD83)**	**24 HR.** 28.4
TOTAL DEPTH 200.5 ft	**DRILL MACHINE** CME 45 Trailer	**DRILLER: F. Cox**	**HAMMER TYPE** 140 lbs Auto
DATE STARTED 8/1/06	**COMPLETED** 8/9/06	**CORE BARREL TYPE: HQ split inner barrel**	
CORE SIZE HQ	**TOTAL RUN** 157.4 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
127.2	195.5		2:54 3:02 2:20 2:05	100%	100%					Hard Rock: Light gray to dark gray and light pink, slightly weathered to fresh, close to wide fracturing, hard to very hard, QUARTZ-BIOTITE GNEISS *(continued)*
		5.0	3:01 2:02 2:34 2:40	(5.0) 100%	(5.0) 100%	UC-200.0'				-No Joints
122.2	200.5		2:52							122.2 — 200.5
										Coring terminated at 200.5 ft in Hard Rock: Very hard, QUARTZ-BIOTITE GNEISS

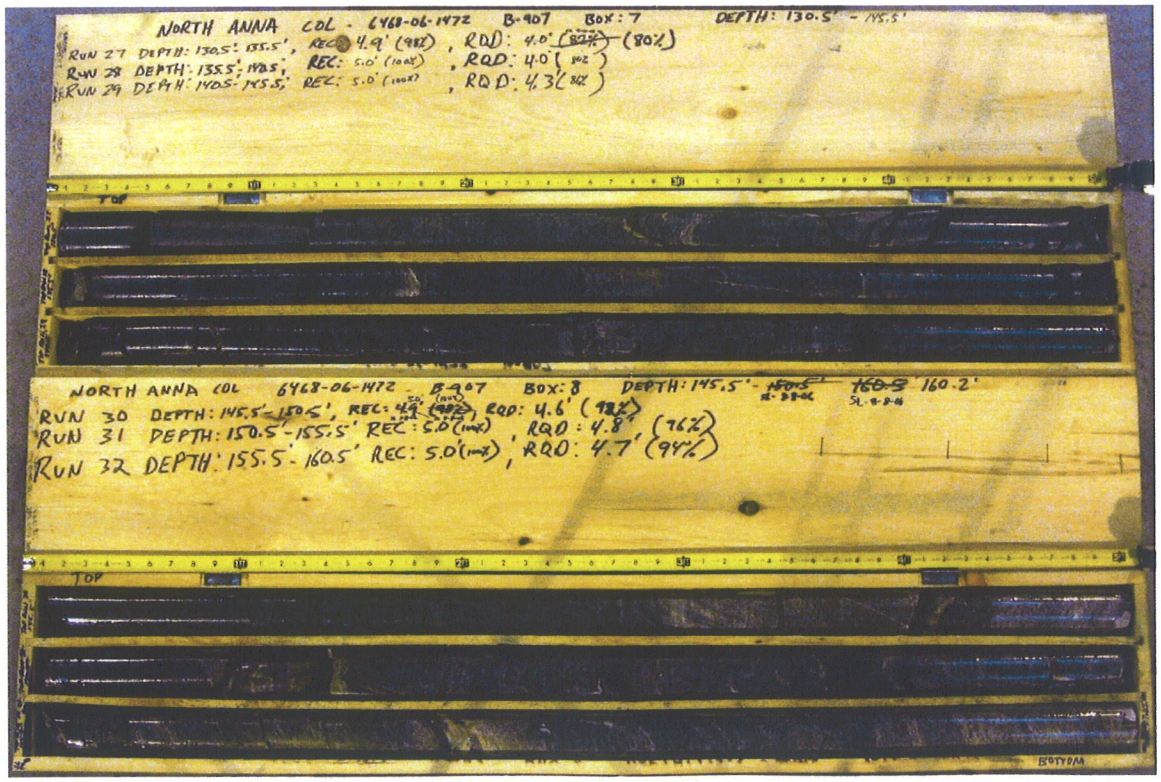


B-907 – Box 1
B-907 – Box 2

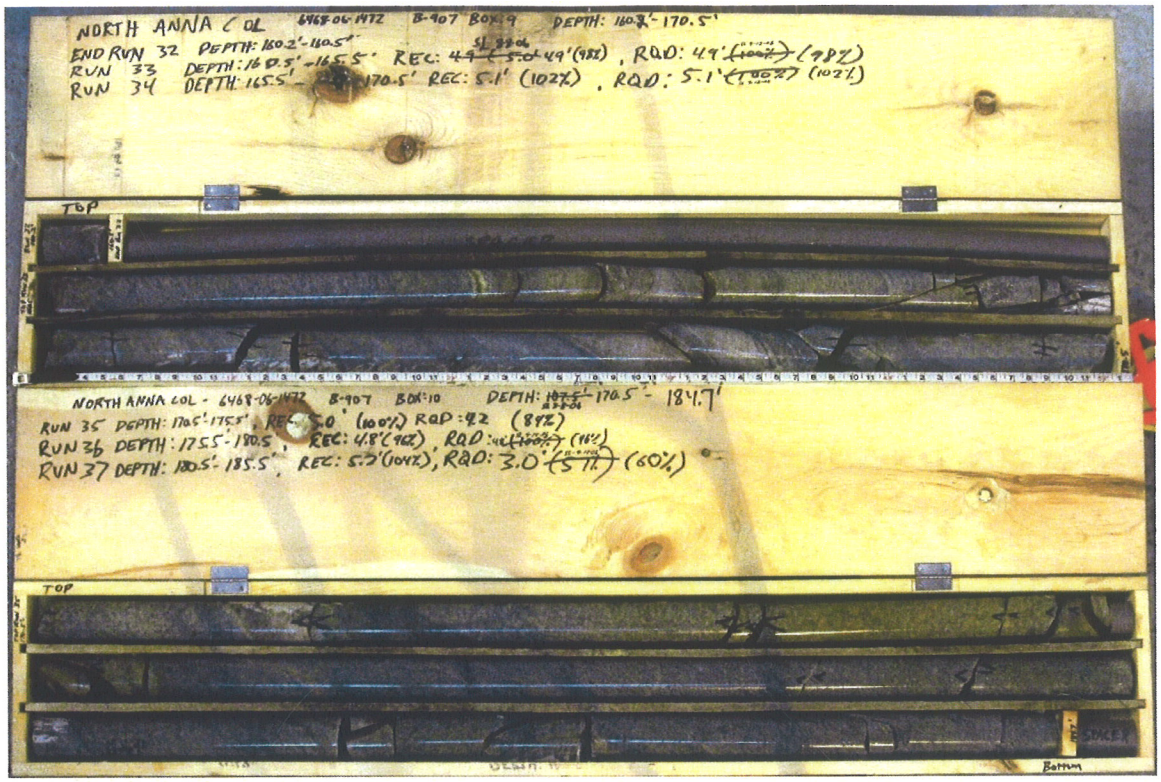
B-907 – Box 3
B-907 – Box 4



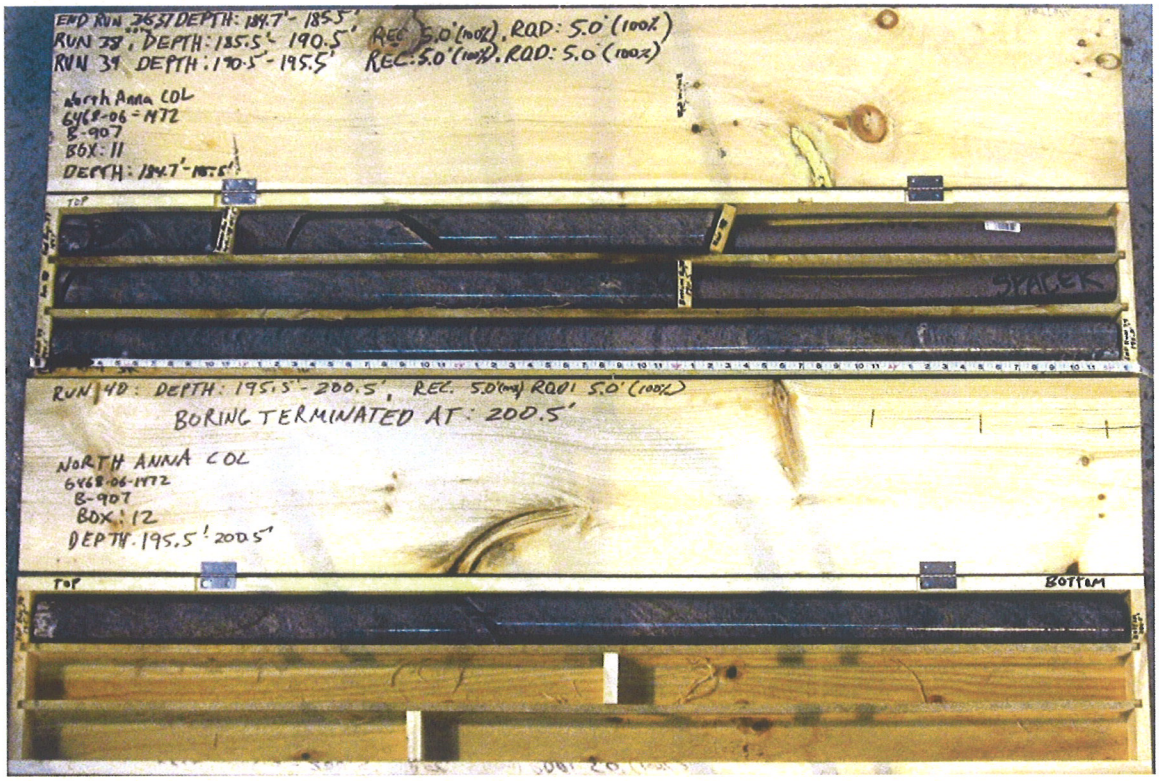
B-907 – Box 5
B-907 – Box 6



B-907 – Box 7
B-907 – Box 8



B-907 – Box 9
B-907 – Box 10



B-907 – Box 11
B-907 – Box 12