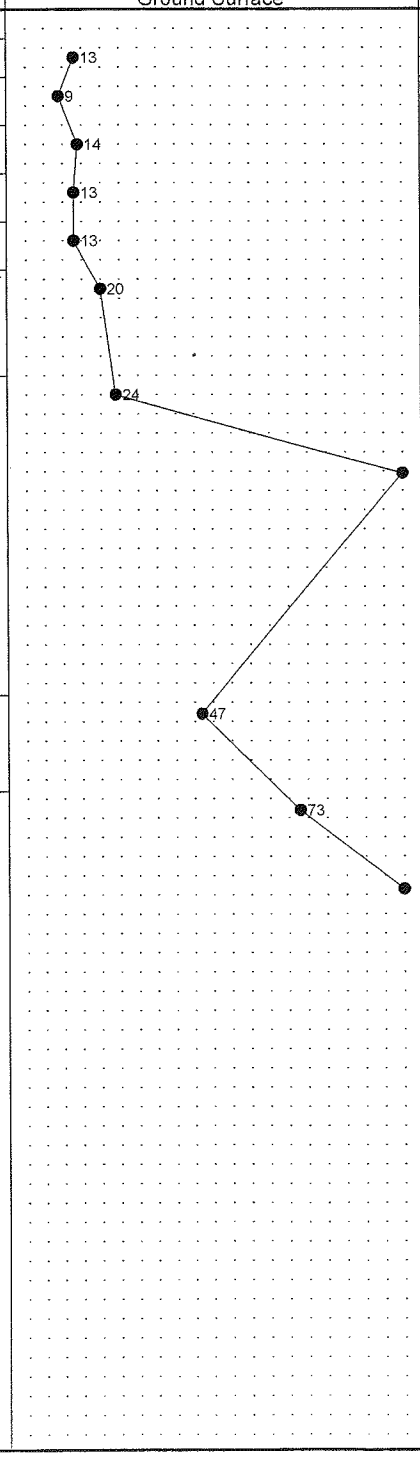
GEOTECHNICAL BORING LOG

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	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	914-1				294.5 / 3.0
291.5	6.0	12	4	5	914-2			Clayey SAND (SC), yellowish brown (10YR 5/6), moist, stiff (Residual Soil)	292.5 / 5.0
289.0	8.5	4	6	8	914-3			Silty, fine to coarse SAND (SM), yellowish brown (10YR 5/6), moist, medium dense, trace rock fragments (Residual Soil)	
286.5	11.0	5	7	6	914-4				
284.0	13.5	4	6	7	914-5				
278.5	19.0	8	11	9	914-6				
273.6	23.9	11	15	9	914-7				275.5 / 22.0
		50/0.2			914-8			Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS	272.4 / 25.1
261.9	35.6							Silty, fine to coarse SAND (SM), yellowish brown (10YR 5/6), moist, dense to very dense, rock fabric (Residual Soil)	
256.9	40.6	8	12	35	914-9				
251.9	45.6	28	30	43	914-10				255.4 / 42.1
		50/0.1			914-11			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	
								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	236.9 / 60.6

BLOWS PER FOOT (0, 20, 40, 60, 80, 100)



GEOTECHNICAL BORING 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
COLLAR ELEV. 297.5 ft (NAVD88)	NORTHING 3,909,940 US ft (NAD83)	EASTING 11,685,922 US ft (NAD83)
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 8/22/06	COMPLETED 8/29/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	11.9
24 HR.	23.5

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
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

GEOTECHNICAL BORING 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
COLLAR ELEV. 297.5 ft (NAVD88)	NORTHING 3,909,940 US ft (NAD83)	EASTING 11,685,922 US ft (NAD83)
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
DATE STARTED 8/22/06	COMPLETED 8/29/06	CORE BARREL TYPE: HQ 3 triple tube-wireline

GROUND WATER (ft)	
0 HR.	11.9
24 HR.	23.5

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
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

GEOTECHNICAL CORING 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	
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 — Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS *(continued)* — 25.1 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				253.0 — Weathered Rock: Yellowish brown, severely weathered, soft, QUARTZ-BIOTITE GNEISS (2 joints at 40°, 1 joint at 5°) — 44.5
251.9	45.6									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
251.8	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°)

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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
										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°)

GEOTECHNICAL CORING LOG

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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
COLLAR ELEV. 297.5 ft (NAVD88)	NORTHING 3,909,940 US ft (NAD83)	EASTING 11,685,922 US ft (NAD83)
TOTAL DEPTH 200.5 ft	DRILL MACHINE CME 550 ATV	DRILLER: G. Akins
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	

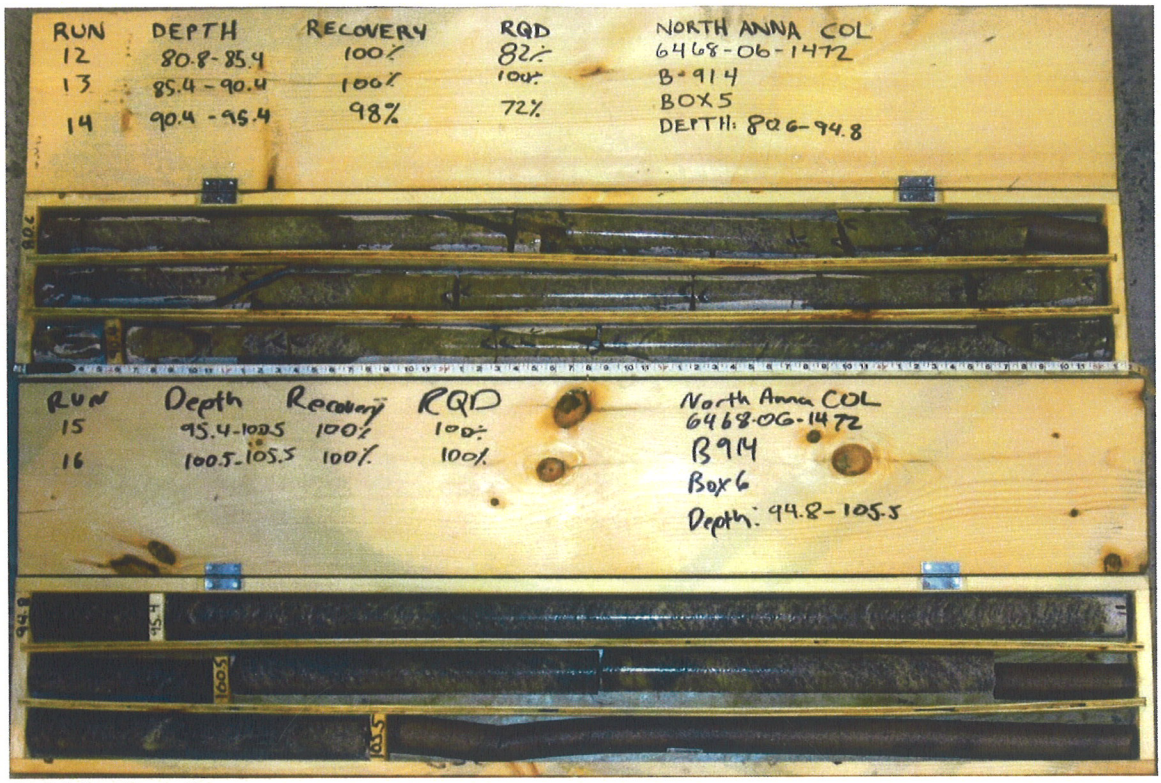
GROUND WATER (ft)	
0 HR.	11.9
24 HR.	23.5

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
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)*
117.0	180.5	4.9	3:30 4:30 4:30 4:45 8:30/0.9	(4.9) 100%	(4.9) 100%	31				
112.0	185.5	5.0	4:00 3:00 3:00 3:00 3:00	(5.0) 100%	(4.6) 92%	32				(joints at 20-70°)
107.0	190.5	5.0	6:00 3:30 4:00 4:15 5:45	(4.7) 94%	(4.2) 84%	33				
102.0	195.5	5.0	9:00 10:30 4:00 4:15 4:45	(5.0) 100%	(5.0) 100%	UC-192.7'				(Joints at 70°)
97.0	200.5	5.0	5:30 5:00 6:00 5:30 6:45	(5.0) 100%	(4.9) 98%	35				(Joints at 50°)
										97.0 — 200.5
										Coring terminated at 200.5 ft in Hard Rock: Very hard, BIOTITE GNEISS

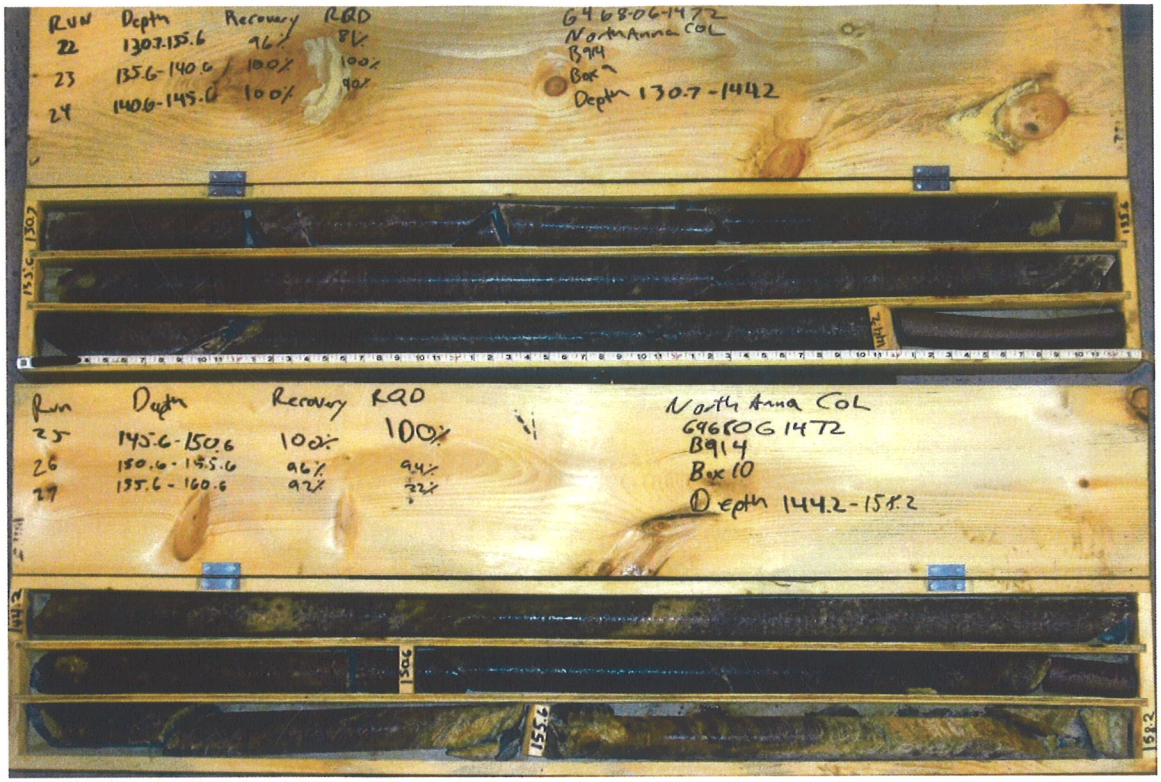
B-914 – Box 1
B-914 – Box 2

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