

APPENDIX A
LIMITATIONS

HYDROGEOLOGICAL LIMITATIONS

1. The conclusions and recommendations submitted in this report are based in part upon the radiological, chemical and physical data from water analyses. These data were obtained from specific sampling locations at specific times. The full nature and extent of variations in the data between these specific locations and times are not known. The conditions existing between these specific locations and times have only been inferred using interpolation and extrapolation based on judgment.
2. The subsurface profiles described in the text and presented in the report figures are intended to convey anticipated trends in subsurface conditions. The conditions shown are approximate and generalized and were developed, in part, based on judgment. For specific information at specific locations, refer to the individual subsurface investigation logs.
3. Water level readings (piezometric pressures) have been made in the specific borings, monitoring wells, and Waterloo installations at times and under conditions stated. These data have been reviewed and interpretations have been made in the text and on the figures of this report. However, it must be noted that temporal and spatial fluctuations in the level of the groundwater may occur due to variations in rainfall and other factors different from those prevailing at the time and location measurements were made.
4. Where quantitative laboratory testing has been conducted by an outside laboratory, GZA has relied upon the validity of the data provided, and has not conducted an independent laboratory evaluation of the reliability of these data.
5. Radiological and chemical analyses have been performed for specific parameters during the course of this study, as summarized in the text. Additional constituents not searched for may be present in soil and groundwater at the site.
6. Variations in the types and concentrations of contaminants and variations in their flow paths may occur due to seasonal water table fluctuations, past and current plant operational practices, the passage of time, and other factors. Should additional data (water analyses, water elevations, subsurface deposits, plant construction and operation, etc.) become available in the future, these data should be reviewed by GZA, and the conclusions and recommendations presented herein modified accordingly.
7. It is recommended that this firm be retained to provide further engineering services during design, implementation, and/or construction of any remedial measures, if necessary. This is to observe compliance with the concepts and recommendations contained herein and to allow design changes in the event that subsurface conditions differ from those anticipated.

APPENDIX B
BORING LOGS

BORING LOG

SH. 1 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-30

Reviewed by: M.A. Ponti, Jr - D. Schipper	
PROJECT NO: 41.0017869.00	COORDINATES:
G. SURF. EL: 51.7 feet	NORTH: 462996.83
DATUM: NGVD 1929	EAST: 604885.30
FINAL BORING DEPTH: 61.4 feet	

DRILLING RIG MODEL: GME LSS Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS				
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	TIME	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Galas/Maurice Pont	Refer to Table 6.1 for Groundwater Data				
CASING HAMMER: N.A.	DATE START: 11/9/05					
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 11/11/05					

DEPTH (FT)	CORING / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																		
												HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT								
												see below for values					see below for values					see below for values								
												1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER				
									Top of bedrock at 0 feet		1																			
5											2																			
	4	R1	5-10		5.0/5.0	100	100		R1: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, moderately close, horizontal to sub-horizontal, iron oxide stained, joints/fractures; slightly mylonized texture.																					0
	5																													0
	4																													1
	4																													1
10																														0
	3	R2	10-15		5.0/5.0	100	100		R2: Hard, fresh, fine grained, gray to light brown MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth, moderately close, sub-horizontal, iron-oxide stained joints/fractures; mylonized texture.																					0
	4																													1
	3																													0
	3																													0
15																														0
	3	R3	15-20		5.0/5.0	100	74		R3: Hard, fresh, fine grained, gray MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth to rough, close to moderately close, moderately dipping to vertical, iron-oxide stained joints/fractures; mylonized texture.																					0
	4																													1
	3																													2
	3																													4
20																														5
	4	R4	20-25		5.0/5.0	100	100		R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth, wide, sub-horizontal, iron-oxide stained joints/fractures. Possible fault, slightly weathered brown discontinuity at 20.4'.																					1
	4																													0
	5																													0
	4																													0
25																														0
	3	R5	25-30		5.0/5.0	100	98		R5: Hard, fresh, fine grained, gray to tan MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained, mylonized texture; several healed, white, calcified joints/fractures; healed micro-breccia, healed micro-offsets.																					1
	4																													0
	3																													0
	4																													2
30																														0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS			
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3"	MOD CLOSE/MOD THIN	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:

- Boring performed within an approximately 20-foot-deep excavation. Rock encountered at ground surface estimated to be approximately elev. 51.7 feet. Currently nominal elevation is at 77.5. The ground surface elevation referenced refers to the ground surface at final completion.
- Performed 8-inch diameter vacuum excavation to 5 feet (top of bedrock). Spun 4-inch-diameter HW casing approximately 6 inches into the bedrock. Grout placed between exterior of the casing and the excavation sidewalls.

BORING NO. MW-30

BORING LOG



**Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY**

BORING No. MW-30

Reviewed by: M.A. Ponti, Jr - D. Schipper

PROJECT NO: 41.0017869.00

COORDINATES:

G. SURF. EL. 51.7 feet

NORTH: 462996.83

DATUM: NGVD 1929

EAST: 604885.30

FINAL BORING DEPTH 61 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas/Maurice Ponti	DEPTH	CASING
CASING HAMMER: N.A.	DATE START: 11/9/05	STABILIZATION TIME	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 11/11/05	Refer to Table 6.1 for Groundwater Data	

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC.(IN./IN) ROCK PEN./REC.(FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT																	
													HARDNESS					WEATHERING					see below for values																	
													1	2	3	4	5	1	2	3	4	5	1	2	3	4														
													see below for values					see below for values					see below for values																	
													0	0	0	0	0	0	0	0	0	0	0																	
													3	R7	35-40		5.0/5.0	100	95		R7: Hard, fresh, fine grained, gray to white MARBLE with faint, very thin, moderately dipping foliation: rough to smooth, very close to moderately close, iron-oxide stained joints/fractures; 35.6'-36.7': Fracture zone, smooth to rough, close, moderately dipping to horizontal, iron-oxide stained joints/fractures.	FZ FZ															2	1	0	1
													0	0	0	0	0	0	0	0	0	0	0																	
													3	R8	40-45		5.0/5.0	100	100		R8: Hard, fresh, fine grained, gray to white MARBLE with faint, very thin, moderately to sub-vertical foliation: smooth to rough, moderately close to wide, sub-vertical, iron-oxide stained joints/fractures; 43.0' -45.5': Fracture zone, smooth, close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures.	FZ FZ																		
													0	0	0	0	0	0	0	0	0	0	0																	
													4	R9	45-50		5.0/5.0	100	92		R9: Hard, fresh, fine grained, gray to white MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: one, rough, close to wide, sub-vertical, iron-oxide stained joint/fracture; trace pyrite clusters, stringers, within matrix; mylonized texture.	FZ FZ																		
													0	0	0	0	0	0	0	0	0	0	0																	
													3	R10	50-55		5.0/5.0	100	100		R10: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical to moderately dipping foliation: rough, wide, sub-vertical, iron-oxide stained joints/fractures.																			
													0	0	0	0	0	0	0	0	0	0	0																	
													4	R11	55-60		5.0/5.0	100	74		R11: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical, foliation: rough to smooth, close to moderately close, sub-horizontal to vertical, iron-oxide stained joints/fractures.																			
													0	0	0	0	0	0	0	0	0	0	0																	
													4																											

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING		NO. PER FT	SPACING/THICKNESS				ANGLE	ATTITUDE		
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1		COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN		0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN		5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/ MOD THIN		35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SIGHT	(4)	11-20	3'-10'	WIDE/THICK		55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK		85°-90°	VERTICAL	
		>30	HARD												

NOTES:

BORING LOG

SH. 3 of 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-30

Reviewed by: M.A. Ponti, Jr - D. Schipper

PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL.: 51.7 feet NORTH: 462996.83
DATUM: NGVD 1929 EAST: 604885.30
FINAL BORING DEPTH: 61 feet

DRILLING RIG MODEL: CME L55 Track Rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS				
SAMPLER HAMMER: N.A.		FOREMAN: Doug Wood		DATE	TIME	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)		ENGINEER: Anton Gallas/Maurice Ponti		Refer to Table 6.1 for Groundwater Data				
CASING HAMMER: N.A.		DATE START: 11/9/05						
ROCK CORE: 3 7/8-inch diameter (HQ)		DATE END: 11/11/05						

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT						
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT											
													see below for values					see below for values					see below for values											
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER							
3	R12	60-61				1.0/1.0	100	100		R12: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical foliation: smooth, close, sub-vertical, iron-oxide stained End of Boring at 61.4 feet.																								2
65												3																						

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3'	MOD CLOSE/MOD THIN	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL	
		>30	HARD								

NOTES:
3. Waterloo multi-level sampling system installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with ground surfi

BORING LOG

SH. 1 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

Boring No. MW-31

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL.: 79.74 feet NORTH: 462969.84
DATUM: NGVD 1929 EAST: 604924.22
FINAL BORING DEPTH: 90.4 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Patrick Mahon	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 12/14/05	CASING	STABILIZATION TIME
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 12/20/05		

DEPTH (FT)	CORING (MINIFT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH.	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
										(No Soil Samples Taken)																		
5										Top of Bedrock at 4 feet																		
	7	R1	6-10			5.0/5.0	100	63		R1: Hard, fresh to moderately weathered, fine grained, gray-tan MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.																	0	
	6.5																											4
	5									8'-17.6': Fractured zone, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																10	
10	4																											9
	5																											2
	4.5	R2	11-15.6			4.8/4.6	100			R2: Hard, fresh, fine grained, gray-tan MARBLE with faint, very thin, sub-vertical foliation: rough to smooth, very close to close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures.																	4	
	4																											2
	4																											3
15	5																											1
	6									R3: Hard, fresh, fine grained, gray-tan MARBLE with faint, very thin sub-horizontal to vertical foliation and rough, sub-vertical foliation: rough to smooth, very close to close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures.	FZ																1	
	4	R3	15.6-20.6			5.0/4.9	98																					3
	5																											3
	5																											2
20	4.5																											3
	5.5									R4: Hard, fresh to slightly weathered, fine grained, tan-white MARBLE with faint, very thin sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, silt coated, iron-oxide stained joints/fractures;																		7
	4.5	R4	20.6-25.6			5.0/5.0	100	76		21.9'-22.6': Fracture zone, smooth, very close to close, sub-horizontal to sub-vertical iron-oxide stained joints/fractures;	FZ																1	
	4									24.7'-25.6': Fracture zone, rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.																	3	
	4.5																											1
25	5																											0
	3.5									R5: Hard, fresh, fine grained, tan-white MARBLE with faint, very thin, sub-vertical foliation; smooth to rough, horizontal to sub-vertical, silt coated, iron-oxide stained joints/fractures.	FZ																	9
	4	R5	25.6-30.4			4.8/4.6	96	83																				2
	4																											2
	3.5																											2
30	5																											2

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE	85°-90°	VERTICAL

NOTES:
 1. Performed 8-inch-diameter vacuum excavation to 4 feet (top of bedrock). Spun 4-inch-diameter HW casing approximately 6 inches into the bedrock. Grout placed between the exterior of the casing & the excavation sidewalls. Current Ground Surface Elevation is 77.45 feet
 2. Slight loss of drilling fluid at approx. 17 feet
 3. Brown drilling fluid return observed while drilling at depths between 20 to 21 feet and 25 to 26 feet

BORING NO. MW-31

BORING LOG

SH. 2 of 3



**Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY**

Boring No. MW-31

Reviewed by: M.A. Ponti, Jr - D. Schipper
 PROJECT NO: 41.0017869.00 COORDINATES:
 G. SURF. EL.: 79.74 feet NORTH: 462969.84
 DATUM: NGVD 1929 EAST: 604924.22
 FINAL BORING DEPTH: 90 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aqualer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Patrick Mahon	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 12/14/05		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 12/20/05		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER		
4		R6	30.4-35.4			5.0/5.0	100	90		R6: Very hard to hard, fresh, fine grained, tan-white MARBLE, with faint, very thin, moderately dipping to sub-vertical foliation: rough, very close to moderately close, horizontal to sub-vertical, iron-oxide stained joints/fractures;																			0
3																													0
4											FZ																	6	
8																												0	
35																												0	
5.5																												0	
7		R7	35.4-37.4			2.0/2.0	100	100		R7: Very hard to hard, fresh, fine to medium grained, gray to light brown MARBLE with faint, very thin, sub-vertical foliation rough, moderately close to wide, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures; few very thin to thin, very hard silica rich zones.																		0	
13												4																0	
7.5		R8	37.4-40.4			3.0/3.0	100	100		R8: Very hard, fresh, fine grained MARBLE, with faint, very thin moderately dipping foliation: smooth to rough, irregular, sub-horizontal to moderately dipping, slightly weathered joints/fractures.																		0	
10.5																												0	
40																												0	
9.5																												0	
7		R9	40.4-45.4			5.2/5.2	100	100		R9: Very hard, fresh to slightly weathered, fine grained, gray to white MARBLE with faint, very thin, sub-vertical to moderately dipping foliation: smooth, close to moderately wide, moderately dipping, slightly weathered, iron-oxide stained joints/fractures.		5																0	
9.5																												1	
2																												0	
2																												0	
45																												1	
2.5																												0	
3		R10	45.4-50.4			5.0/5.0	100	92		R10: Very hard, fresh, fine grained, gray MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: rough to smooth, very close to moderately close, horizontal to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.		6																1	
3																												1	
3																												3	
3																												0	
50																												0	
5																												0	
3		R11	50.4-55.4			4.8/4.8	100	92		R11: Very hard to hard, fresh slightly weathered, fine grained, tan-white-light brown, MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth to rough, very close to moderately close, moderately dipping to sub-vertical, slightly weathered iron-oxide stained joints/fractures; slightly pitted texture at 52.6';																		2	
3.5																												3	
3																												3	
55																												0	
3																												0	
3.5																												0	
4		R12	55.4-60.4			5.0/5.0	100	98	35	R12: Very hard, fresh to slightly weathered, fine grained, tan-white MARBLE with faint, very thin, moderately dipping, convoluted foliation: rough to smooth, very close to close, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained joints/fractures;																	2		
3									35																			1	
3																												3	
3.5																												1	
60																												1	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS		
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2' VERY WIDE	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2'-1' Close	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3' Mod Close	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10' Wide	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10' Very Wide	85°-90°	VERTICAL

NOTES:
 4. Wire line casing was removed and core bit was sharpened between R-7 and R-4
 5. Borehole was flushed with clear water at 41.6'
 6. Complete loss of drilling fluid while coring between 46.6' and 50.0'

BORING NO. MW-31

BORING LOG SH. 3 of 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

Boring No. MW-31
 Reviewed by: M.A. Ponti, Jr - D. Schipper
 PROJECT NO: 41.0017869.00 COORDINATES:
 G. SURF. EL.: 79.74 feet NORTH: 482969.84
 DATUM: NGVD 1929 EAST: 604924.22
 FINAL BORING DEPTH: 90 feet

DRILLING RIG MODEL: CME L55 Track Rig BORING CO.: Aquifer Drilling and Testing
 SAMPLER HAMMER: N.A. FOREMAN: Doug Wood
 CASING SIZE: 4-inch diameter (HW) ENGINEER: Patrick Mahon
 CASING HAMMER: N.A. DATE START: 12/14/05
 ROCK CORE: 3 7/8-inch diameter (HQ) DATE END: 12/20/05

GROUND WATER READINGS
 DATE DEPTH CASING STABILIZATION TIME
 Refer to Table 6.1 for Groundwater Data

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																							
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT													
													see below for values					see below for values					see below for values													
					1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER																	
60.4-65.4	4	R13				5.0/5.0	100	100		R13: Hard to very hard, fresh, fine grained, tan-white-brown MARBLE, with faint, very thin, convoluted to sub-vertical foliation: smooth, moderately close to wide, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures; 60.4' - 62.3' : Very hard, iron-oxide stained, fine grained, light brown, silica rich, marble.																										0
																																			1	
																																			1	
																																			0	
65																																			0	
65.4-70.4	3.5	R14				5.0/5.0	100	100		R14: Hard to very hard, fresh, fine grained ,white to light gray MARBLE, with faint, very thin, sub-vertical foliation: no apparent joints/fractures.																									0	
																																			0	
																																			0	
70																																			0	
70.4-75.4	3	R15				5.0/5.0	100	100		R15: Hard, fresh, fine grained, white to gray MARBLE, with faint, very thin, sub-vertical foliation: one smooth, moderately close to wide, sub-horizontal iron-oxide stained joints/fracture.		7																							0	
																																			0	
																																			0	
75																																			1	
75.4-80.4	3.5	R16				5.0/5.0	100	92		R16: Hard, fresh to severely weathered, fine grained, white to gray MARBLE, with faint, very thin, sub-vertical foliation: rough, close to wide, sub-horizontal to moderately dipping, clay gouge coated, slightly weathered joints/fractures; 77.0' - 77.2': Fracture zone: very soft, rough, very close, iron-oxide brown stained, moderately weathered, clay coated, sub-vertical joints/fractures.			FZ																						2	
																																			0	
80																																			0	
80.4-85.4	3	R17				5.0/5.0	100	93		R17: Hard, slightly weathered, fine grained white-gray-light brown MARBLE, with faint, very thin, sub-vertical foliation: rough, close to wide, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained																								1		
																																			1	
																																			0	
85																																			0	
85.4-90.4	3.5	R18				5.0/5.0	100	86		R18: Hard, slightly weathered, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation: smooth to rough, very close, to moderately close, horizontal to sub-vertical, silt coated to iron-oxide stained joint/fractures.																								1		
																																			0	
90										End of Boring at 90.4 ft.		8																						2		
																																			3	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS							
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS			WEATHERING		NO. PER FT			SPACING/THICKNES			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	WIDE		0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	VERY WIDE		5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	Mod Close		35°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	Wide		55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	Very Wide		85°-90°	VERTICAL		

NOTES:
 7. Complete loss of drilling fluid while coring between approximately 70.5ft and 90 ft
 8. Waterloo multi-level sampling system installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with ground surf

BORING NO. MW-31

BORING LOG

SH. 2 of 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-32

Reviewed By: M.A. Ponti, Jr. - D.Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 78.90 feet NORTH: 462953.48
 DATUM: NGVD 1929 EAST: 604876.03
 FINAL BORING DEPTH (FT) 200

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: ADT	GROUND WATER READINGS			
SAMPLER HAMMER: N.A	FOREMAN: D. Wood	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gattas/Maurice Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A	DATE START: 12/21/05				
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 1/10/06				

DEPTH (FT)	CASING (BPF) / CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) / ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																		
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT								
													see below for values					see below for values					see below for values								
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER				
30	3									R-5: Hard, fresh, fine grained, white MARBLE, with faint, very thin to thin, sub-vertical foliation: smooth, close to moderately close, rough to smooth, moderately dipping to sub-vertical, slightly weathered, iron-oxide stained joints/fractures; healed mylonized texture.																				4	
	3	R5	31-36			5.0/5.0	100	100																						0	
	6.5									32.1' - 34.0': gray quartz veins, moderately dipping, sub-vertical.																				0	
	4																													1	
35	3																													0	
	5																													1	
	7	R6	36-41			5.0/5.0	100	100		R6: Hard, fresh, fine grained, white MARBLE, with faint, very thin, sub-vertical foliation: smooth, close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures; healed mylonized zone.																			0		
	4									38.2' - 38.3': Fracture zone: healed fractures with calcite mineralization.	FZ																			2	
	4																													1	
40	5																													2	
	4																													1	
	4	R7	41-46			5.0/5.0	100	100		R7: Hard, fresh, fine grained, white dolomitic MARBLE, with faint, very thin, sub-vertical foliation: smooth, close to moderately close, sub-horizontal, to moderately dipping, iron-oxide stained joints/fractures.																				0	
	4																													1	
	4																													1	
45	5																													0	
	4																													0	
	2	R8	46-51			5.0/4.6	92	82		R8: Hard to moderately hard, fresh to moderately weathered, fine grained, white MARBLE, with close to moderately close, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained, joints/fractures;																				1	
	4																													0	
	3																													0	
50	3.5									50.2' - 50.5': green, highly weathered, mineralized rock; 50.5' - 51.0': discontinuity - no recovery.		2																		1	
	2											3																		8	
	3	R9	51-56			5.0/4.5	90	62	50	R9: Hard to medium hard, fresh to moderately weathered, fine grained, white gray, light brown MARBLE with faint very thin to thin, sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, severely weathered, iron-oxide stained joints/fractures; 51.0'-54.0': Healed fault breccia; calcified, dolomitized mineralization; 54.1'-57.8': Fractured zone: rough, very close to close, horizontal to vertical, severely weathered, iron-oxide stained joints/fractures.																					2
	3								50																					1	
	2								50																					0	
55	2																													11	
	2																													13	
	3	R10	56-61			5.0/4.4	88	64		R10: Hard to medium hard, fresh to severely weathered, gray-brown, fine grained MARBLE, with faint, very thin, sub-vertical foliation: smooth to rough, very close to moderately close, horizontal to vertical, severely weathered, iron-oxide stained, joints/fractures. 56'-57.8': Fractured zone: Hard to medium hard, fresh to moderately weathered, fine grained, white gray, light brown MARBLE with faint very thin to thin, sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, severely weathered, iron-oxide stained joints/fractures.	FZ																			5	
	4																													11	
	4																													0	
	4																													0	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS									
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)					0
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2'-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	1'-3'	MOD CLOSE/MOD THIN	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 2. Complete loss of drilling fluid from 49 to 50 feet
 3. No drilling fluid return between 51 to 54 feet

BORING NO. MW-32

BORING LOG

SH. 3 of 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING No. MW-32

Reviewed By: M.A. Ponti, Jr. - D.Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 78.90 feet NORTH: 462953.48
DATUM: NGVD 1929 EAST: 604876.03
FINAL BORING DEPTH (FT) 200

DRILLING RIG MODEL: CME L55 Track Rig BORING CO.: ADT
SAMPLER HAMMER: N.A. FOREMAN: D. Wood
CASING SIZE: 4-inch diameter (HW) ENGINEER: Anton Gallas/Maurice Ponti
CASING HAMMER: N.A. DATE START: 12/21/05
ROCK CORE: 3 7/8-inch diameter (HQ) DATE END: 1/10/06

Table with columns: DEPTH (FT), CASING/BPFY CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 6 INCH, N VALUE, SOIL PEN / REC (IN/IN) ROCK PEN/REC. (FT/FT), TOTAL CORE REC (%), ROD (%), DRILLING FLUID LOSS (GALLONS), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Legend table with categories: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), JOINT/FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
BORING NO. MW-32

BORING LOG

SH. 7 OF 7



**Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY**

BORING No. MW-32

Reviewed By: M.A. Ponti, Jr. - D.Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 78.90 feet NORTH: 462953.48
 DATUM: NGVD 1929 EAST: 604876.03
 FINAL BORING DEPTH (FT) 200

DRILLING RIG MODEL: CME L55 Track Rig SAMPLER HAMMER: N.A. CASING SIZE: 4-inch diameter (HW) CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ)	BORING CO.: ADT FOREMAN: D. Wood ENGINEER: Anton Gallas/Maurice Ponti DATE START: 12/21/05 DATE END: 1/10/06	GROUND WATER READINGS DATE DEPTH CASING STABILIZATION TIME Refer to Table 6.1 for Groundwater Data
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DEPTH (FT)	CASING(BPF)/CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN/REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT																		
													HARDNESS					WEATHERING					see below for values													
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER									
180	3.5									R35: Hard, fresh, fine grained, white MARBLE, with faint very thin, sub-vertical foliation: smooth, very close to moderately close, sub-vertical, slightly weathered joints/fractures; 182.1'-182.3': Fracture zone, slightly weathered, sub-vertical fractures; 182.9'-186.0': Slightly pitted texture.																										
		R35	181-186			5.0/5.0	100	94																												
185	3																																			
		R36	186-191			5.0/5.0	100	100																												
190	3																																			
		R37	191-196			5.0/5.0	100	100																												
195	2.5																																			
		R38	196-200			4.0/4.0	100	100																												
200	2.5									End of Boring at 200 ft.																										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN		0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1'	CLOSE/THIN		5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 2-10	1'-3"	MOD CLOSE/MOD THIN		35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 10-20	3'-10'	WIDE/THICK		55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10'	VERY WIDE/VERY THICK		85°-90°	VERTICAL	
		>30	HARD									

NOTES:
 5. Waterloo multi-level sampling system installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with ground surfl

BORING LOG

SH. 1 of 1



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-34

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G SURF. EL. 18.48 feet NORTH: 462976.79
DATUM: NGVD 1929 EAST: 604755.31
FINAL BORING DEPTH (FT): 30 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch-diameter (HW)	ENGINEER: Anton Gallas/Maurice Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 12/7/05				
ROCK CORE: 3 7/8-inch-diameter (HQ)	DATE END: 12/8/05				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N. VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (F / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																			
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT									
													see below for values					see below for values					see below for values									
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	NUMBER				
5										(No Soil Samples Taken)																						
										Top of Bedrock at 3.5 feet																						
10		R1	7-11			4.0/3.6	91	80		R1: Hard, fresh to moderately weathered, fine grained, gray brown MARBLE with no apparent foliation: smooth to rough, very close to moderately close, horizontal to moderately dipping, iron-oxide stained joints/fractures; 10.7'-11.3': Moderately weathered, iron-oxide stained zone.																						
15		R2	11-16			5.0/4.8	96	93		R2: Hard, fresh to moderately weathered, fine grained, gray brown MARBLE with faint, very thin to thin, moderately to sub-vertical foliation: rough, moderately close, horizontal to sub-vertical, iron-oxide stained, moderately weathered joints/fractures; healed breccia.																						
20		R3	16-21			5.0/5.0	100	98		R3: Hard, moderately to slightly weathered, moderately to slightly fractured, fine grained gray MARBLE with moderately close, sub-horizontal to moderately dipping, rough with slightly to moderately weathered joints/fractures; 12.0'-14.1': Slightly weathered, pitted, iron-oxide stained, texture along calcified joints/fractures.																						
25		R4	21-26			5.0/5.0	100	100		R4: Hard, fresh, moderately close to close, fine grained, gray MARBLE with no apparent foliation: smooth, moderately close, sub-horizontal, slightly weathered, iron-oxide stained joints/fractures; trace pitted texture.																						
30		R5	26-30			4.0/3.8	94	94		R5: Hard, fresh, fine grained, gray MARBLE with no apparent foliation: rough, moderately close to close, sub-horizontal to moderately dipping, slightly to moderately weathered joints/fractures.																						
										End of Boring at 30.0'																						

3.00		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
	BPF	CONSISTENCY		HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
4.00	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
3.00	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2'-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
3.00	MEDIUM DENSE	4-6	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING		
30-50	DENSE	6-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:
1. Performed 8-inch-diameter vacuum excavation from 0 to 5 feet. Spun and washed 4-inch-diameter casing from 5 to 7 feet (top of bedrock). Interface sealed with grout.
2. No equipment installed. Boring left as an open borehole monitoring point; 8" diameter well vault installed within concrete, flush with ground surf.

BORING LOG

SH. 1 of 1



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-35

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL. 18.60 feet NORTH: 462962.18
DATUM: NGVD 1929 EAST: 604744.19
FINAL BORING DEPTH: 30 feet

DRILLING RIG MODEL: CME LC55 Track Mounted	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas/Maurice Ponti	Refer to Table 8.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 12/5/05		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 12/6/05		

DEPTH (FT)	CORING (MINIFT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT				
													HARDNESS					WEATHERING						NO. OF FRACTURES PER FOOT			
													see below for values					see below for values						see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	
5										(No Soil Samples Taken)																	
										Top of Bedrock at 8 feet		1															
10	4	R1	8-11			3.0/2.8	94	80		R1: Hard, slightly weathered, fine grained, gray brown MARBLE with faint, very thin, moderately dipping foliation: smooth to rough, very close to close, horizontal to sub-vertical, iron-oxide stained joints/fractures; slightly to moderately pitted texture; fractured zone 8'-10'.	FZ														3		
	4										FZ															3	
	4																									0	
	4	R2	11-16			5.0/5.0	100	100		R2: Hard, slightly weathered, fine grained, gray brown MARBLE with faint, very thin, moderately dipping foliation: rough, close to moderately close, horizontal, silt coated, iron-oxide stained, slightly weathered joints/fractures; slightly pitted texture.																0	
	5																									0	
	5																									0	
15	5																									2	
	4																									0	
	5	R3	16-21			5.0/5.0	100	100		R3: Hard, fresh, fine grained, gray MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth to rough, moderately close, sub-vertical, slightly weathered, iron-oxide stained joints/fractures; trace pitted texture.																0	
	4																									1	
	4																									0	
20	4																									0	
	4																									3	
	3	R4	21-26			5.0/5.0	100	88		R4: Hard, fresh to slightly weathered, fine grained gray to pink MARBLE with faint, very thin, moderately dipping to sub-vertical foliation: smooth to rough, very close to wide, sub-vertical, silt coated, iron-oxide stained joints/fractures; slightly to moderately pitted texture.																1	
	3.5																									2	
	3																									0	
	3																									1	
	3																									0	
	3	R5	25-30			4.0/3.8	96	88		R5: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to wide, sub-vertical, iron-oxide stained joints/fractures; slightly pitted texture; 28.8'-29.4': Fractured zone, rough to smooth, very close, sub-vertical, slightly weathered, iron-oxide stained joints/fractures.																0	
	3.5																									0	
	3																									1	
30	3.5									End of Boring at 30 feet	FZ	2														3	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					SPACING/THICKNESS			ANGLE ATTITUDE	
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT				
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-30	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:
1. Performed 8-inch-diameter vacuum excavation from 0 to 5.5 feet. Spun and washed 4-inch-diameter casing from 5.5 to 8 feet. Interface sealed with grout.
2. No equipment installed. Boring left as an open borehole monitoring point; 8" diameter well vault installed within concrete, flush with ground surface.

BORING NO. MW-35

BORING LOG

SH. 1 of 2



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-36

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL. 11.80 feet NORTH: 463090.60
DATUM: NGVD 1929 EAST: 604657.59
FINAL BORING DEPTH: 54 feet


SAMPLER: Wireline Core Barrel	BORING CO.: ADT	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: D. Wood	DATE	DEPTH
CASING SIZE: 6-inch diameter (SW)	ENGINEER: Anton Galias/Maurice Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 1/18/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 1/24/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
5																												
10		S1	10-12	12 - 16		24/20				Top 10": Dense, gray, fine, moist SAND, trace Silt. Bottom 10": Fragments of white - gray.MARBLE.																		
15		S2	15-17	30 - 13		24/19				S2: Medium dense, gray, fine to coarse SAND, some fine Gravel, trace Silt.																		
20				9 - 5																								
25	8	R1	24-29			5.0/3.5	70	.25		Top of Bedrock at 24 feet R1: Hard, fresh, fine grained gray - white MARBLE, with no apparent foliation; smooth, close to very close, sub-horizontal to sub-vertical, slightly to moderately weathered, joints/fractures.		1																
16																												
15																												
22										27.8'-28.2' Fracture Zone: Very close, moderately to sub-vertical, dark gray iron-oxide stained, joints/ fractures.			FZ															12
16																											2	
30	5	R2	29-34			5.0/5.0	100	86																			3	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL	
		>30	HARD											

NOTES:
1. Performed hand excavation to 4 feet. Spun and washed 6-inch-diameter (SW) casing from 4 to 24 feet. Casing spun approximately 6 inches into bedrock. Casing Removed after well completion.

BORING NO. MW-36

BORING LOG										BORING No. MW-36		SH. 2 of 2																		
										Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY			Reviewed by: M.A. Ponti, Jr. - D. Schipper PROJECT NO: 41.0017869.00 G. SURF. EL. 11.80 feet DATUM: NGVD 1929 FINAL BORING DEPTH: 54 feet COORDINATES: NORTH: 463090.60 EAST: 604657.59																	
													SAMPLER: Wireline Core Barrel SAMPLER: Split Spoon CASING SIZE: 6-inch diameter (SW) CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ)			BORING CO.: ADT FOREMAN: D. Wood ENGINEER: Anton Gallas/Maurice Pond DATE START: 1/18/06 DATE END: 1/24/06			GROUND WATER READINGS DATE DEPTH CASING STABILIZATION TIME Refer to Table 6.1 for Groundwater Data											
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER			
9										R2: Hard, slightly weathered to fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation: smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures;	FZ																	1		
8										27.0'-33.0': Fracture zone, rough to smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																	2		
11																													2	
11																													1	
35		R3	34-39			5.0/5.0	95	85		R3: Moderately hard to hard, slightly weathered to fresh, fine grained, gray to white MARBLE with faint, very thin to thin, sub-vertical foliation: rough to smooth, very close to close, horizontal to sub-horizontal, moderately weathered, iron-oxide stained joints/fractures;																			1	
11										36.7'-37.9': Slightly weathered, moderately pitted texture.																			0	
11																													5	
9																													1	
11																														1
40		R4	39-44			5.0/5.0	100	100		R4: Hard, slightly weathered to fresh, fine, grained gray to white MARBLE with no apparent to faint, very thin, sub-vertical foliation: smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																		2	
10										39.5'-40.6': Fracture zone: smooth to rough, very close, sub-horizontal to sub-vertical.	FZ																		1	
14																														1
15																														0
16																														1
45		R5	44-49			5.0/5.0	100	72		R5: Hard to moderately hard, fresh to moderately weathered, fine grained light brown-white MARBLE with no apparent foliation: rough, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures;	FZ																		2	
14										44.5'-46.0': Fracture zone, slightly to moderately weathered, pitted, rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained, moderately weathered iron-oxide stained joints/fractures.	FZ																			3
15																														0
17																														1
17																														2
50		R6	49-54			5.0/5.0	100	86		R6: Hard, fresh, fine grained, white to light gray MARBLE with faint, very thin to thin, sub-vertical foliation: smooth to rough, very close to close, sub-horizontal, iron-oxide stained joints/fractures;	FZ																		2	
15										50.5'-53.5': Fracture zone: smooth to rough, very close, sub-horizontal, iron-oxide stained joints/fractures.	FZ																			2
15																														2
16																														2
17																														2
55										End of Boring at 54 feet		2																		3

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT			SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN		0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2'-1"	CLOSE/THIN		5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	1'-3"	MOD CLOSE/MOD THICK		35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10"	WIDE/THICK		55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK		85°-90°	VERTICAL	

NOTES:

2. Monitoring wells installed within the borehole (refer to installation log for details); 8" diameter well vault installed within concrete, flush with the ground surf

BORING NO. MW-36

BORING LOG

SH. 1 of 2



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-37

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL. 15.02 feet NORTH: 463075.37
DATUM: NGVD 1929 EAST: 604604.87
FINAL BORING DEPTH: 57 feet

DRILLING RIG MODEL: Davis DK515	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Dave Carter	DATE	DEPTH
CASING SIZE: 4-inch and 6-inch diameter (HW and SW)	ENGINEER: Anton Gallas	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 1/04/08	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch-diameter (HQ)	DATE END: 1/09/08		

DEPTH (FT.)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES													
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT			
													see below for values					see below for values					see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
5																										
10																										
15																										
20																										
22.0-24.0'		S-1	22-24	17-37	79	2.0/1.6																				
24.0-25.0'						42-43																				
25																										
10	R-1	25-30				5.0/5.0	100	30	5				FZ													2
9									5				FZ													9
12									5				FZ													5
14									5				FZ													7
11									5				FZ													11

(No Soil Samples Taken 0 to 22 feet)

S-1: Spill-spoon sample taken at 22.0-24.0'. Very dense, wet, gray fine to medium SAND, some rock fragments, little Silt.

Top of Bedrock at 25 feet
R-1: Hard, fresh, gray MARBLE with no apparent foln: smooth to rough, very close to close sub-horizontal to sub-vertical, iron-oxide joint/fractures.
25' - 33': Fractured zone: smooth, rough, very close to close, sub-horizontal to sub-vertical, iron-oxide joint/fractures.

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS	
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1) 0	<2" VERY CLOSE/VERY THIN
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2) 1-2	2"-1" CLOSE/THIN
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	(3) 3-10	1"-3" MOD CLOSE/MOD THICK
30-50	DENSE	8-15	STIFF	4	HARD	(4) 11-20	3"-10" WIDE/THICK
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD		>10" VERY WIDE/VERY THICK
		>30	HARD				
							ANGLE ATTITUDE
							0°-5° HORIZONTAL
							5°-35° SUB-HORIZONTAL
							35°-85° MOD DIPPING
							55°-85° SUB-VERTICAL
							85°-90° VERTICAL

NOTES:
 1. Approximately 8-inch-thick void observed beneath the concrete floor slab
 2. Drilled to about 5.5 feet with a 3 7/8-inch-diameter roller bit (void encountered by 4.5 and 5.5 feet)
 3. Spun and washed 4-inch-diameter (HW) casing from 0 to 22 feet and took S-1
 4. Removed HW casing and spun and washed 6-inch-diameter (SW) casing from 0 to 25 feet (top of bedrock). SW casing spun about 6-inches into the bedrock. Interface stabilized with gr
 5. Borehole advanced using fourth gear between 25 and 57 feet b.e.g.

BORING NO. MW-37

BORING LOG

GZA GEOENVIRONMENTAL OF NEW YORK 440 NINTH AVENUE, 18th FLOOR NEW YORK, NEW YORK 10001 GEOTECHNICAL CONSULTANTS	Entergy Indian Point Energy Center Buchanan, NY	BORING NO. MW-38 SHEET 1 of 2 GZA PROJECT NO. 41.0017869.1 PROJECT LOCATION Indian Point
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BORING CO. ADT	DRILLING RIG CME 55	BORING COORDINATES N 603810.21 E 462505.68	
FOUNDED Doug Wood	TYPE OF DRILLING	GROUND SURFACE EL.(FT) 14.34 ft	DATUM NGVD 1929
GZA ENG. Anton Gallas	SW	FINAL BORING DEPTH (FT) 40 ft	DATE START/END 11/29-12/1/05
Reviewed by: M.A. Ponti, Jr. - D. Schipper			

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN TYPE OF HAMMER: AUTOMATIC DONUT SAFETY SLIDING CORE SIZE N/A		GROUNDWATER READINGS				
		DATE	TIME	WATER	CASING	STABILIZATION TIME
REFER TO TABLE 6.1 FOR GROUNDWATER DATA						

DEPTH feet	SAMPLE					SAMPLE DESCRIPTION	NOTES	PROFILE
	NO	DEPTH (Feet)	PEN / REC (inch / inch)	RECOVERY (%)	BLOWS per 6" RQD (%)			
0						Boring was advanced with vacuum truck from 0.2 ft to 7.0 ft.	1	
1								
2								
3								
4								
5								
6								
7								
8								
9								
15	S-1	14.5-16.5	24/20		3-8 11-17	Medium dense, fine to coarse, gray Gravel, little fine to coarse Sand, trace Silt, wet.		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25	S-2	24-26	24/18		4-5 4-3	Loose, brown fine to coarse SAND, some fine Gravel, little Silt		
26								
27								
28								
29								
30								
31								
32								
33								
34								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	NOTES: 1. Performed vacuum excavation from 0 to 7 feet. 2. Drove and washed casing to sampling depths from 7 to 38 feet. HSA-Hollow Stem Auger MR-Mud Rotary MRC-Mud Rotary with continuous casing SW-Spin and Wash
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

BORING LOG

GZA GEOENVIRONMENTAL OF NEW YORK 440 NINTH AVENUE, 18th FLOOR NEW YORK, NEW YORK 10001 GEOTECHNICAL CONSULTANTS	Entergy Indian Point Energy Center Buchanan, NY	BORING NO. <u>MW-38</u> SHEET <u>2 of 2</u> GZA PROJECT NO. <u>41.0017869.1</u> PROJECT LOCATION <u>Indian Point</u>
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BORING CO. <u>ADT</u>	DRILLING RIG <u>CME 55</u>	BORING COORDINATES <u>N 603810.21 E 462505.68</u>
FOREMAN <u>Doug Wood</u>	TYPE OF DRILLING _____	GROUND SURFACE EL.(FT) <u>14.34 ft</u>
GZA ENG. <u>Anton Gallas</u>	SW _____	FINAL BORING DEPTH (FT) <u>40 ft</u>
		DATUM <u>NGVD 1929</u>
		DATE START/END <u>11/29-12/1/05</u>

SAMPLER: UNLESS OTHERWISE NOTED, SAMPLER CONSISTS OF A 2" SPLIT SPOON DRIVEN USING A 140 lb. HAMMER FALLING 30 IN TYPE OF HAMMER: <u>AUTOMATIC</u> DONUT SAFETY SLIDING CASING SIZE: 6" CORE SIZE <u>N/A</u>	GROUNDWATER READINGS				
	DATE	TIME	WATER	CASING	STABILIZATION TIME
	REFER TO TABLE 6.1 FOR GROUNDWATER DATA				

DEPTH feet	SAMPLE					SAMPLE DESCRIPTION	NOTES	PROFILE
	NO	DEPTH (Feet)	PEN / REC (inch / inch)	RECOVERY (%)	BLOWS per 6" RQD (%)			
30	S-3	29-31	24/15		3-13 14-18	Medium dense, gray fine GRAVEL, some coarse to fine Sand, little Silt.		
35								
40	S-4	38-40	24/18		11-13 15-27	Medium dense, gray fine to medium SAND, little Silt.		
45						End of boring at 40 feet		
50								
55								
60								

GRANULAR SOILS BLOWS/FT DENSITY	COHESIVE SOILS BLOWS/FT DENSITY	NOTES 3. Installed monitoring well within borehole (refer to installation log for details). HSA-Hollow Stem Auger MR-Mud Rotary MRC-Mud Rotary with continuous casing SW-Spin and Wash
0-4 VERY LOOSE	<2 VERY SOFT	
4-10 LOOSE	2-4 SOFT	
10-30 MEDIUM DENSE	4-8 M. STIFF	
30-50 DENSE	8-15 STIFF	
>50 VERY DENSE	15-30 V. STIFF	
	>30 HARD	

BORING LOG

SH. 1 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 81.83 feet NORTH: 462425.51
 DATUM: NGVD 1929 EAST: 604676.87
 FINAL BORING DEPTH: 200 feet


DRILLING RIG MODEL: GME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniela Bastos/Maurice Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N/A	DATE START: 2/1/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/10/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
5																											
10																											
15																											
20																											
25	2	R1	24.5-27			2.5/2.0	80	72		Top of Bedrock at 24.5 feet R1: Hard, slightly weathered to fresh, fine grained gray MARBLE with faint, very thin, sub-vertical foliation: rough, very close, sub-vertical, moderately weathered, iron-oxide stained joints/fractures; faint mylonized texture.																	NA
	4																										2
	2																										0
	2	R2	27-32			5.0/4.5	100	90		R2: Hard, slightly weathered to fresh, fine grained gray MARBLE with faint, very thin, sub-horizontal to sub-vertical, slightly to moderately weathered, iron-oxide stained joints/fractures.																	0
	3																										2
30	3																										2

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 1. Performed 8-inch-diameter vacuum excavation to 8 feet. Spun and washed 4-inch-diameter (HW) casing from 8 to 24.5 feet (top of bedrock). Casing spun approximately 6 inches into bedrock interface sealed with grout. NA indicates no data available

BORING NO. MW-39

BORING LOG										BORING No. MW-39										SH. 2 OF 7										
										Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY										Reviewed by: M.A. Ponti, Jr. - D. Schipper										
																				PROJECT NO: 41.0017869.10					COORDINATES:					
DRILLING RIG MODEL: CME 55 Truck Rig					BORING CO.: Aquifer Drilling and Testing					G. SURF. EL. 81.83 feet					NORTH: 462425.51															
SAMPLER HAMMER: N.A.					FOREMAN: Doug Wood					DATE: _____					DEPTH: _____					CASING: _____					STABILIZATION TIME: _____					
CASING SIZE: 4-inch diameter (HW)					ENGINEER: Daniela Bastos/Maurice Ponti					Refer to Table 6.1 for Groundwater Data																				
CASING HAMMER: N.A.					DATE START: 2/1/06																									
ROCK CORE: 3 7/8-inch diameter (HQ)					DATE END: 2/10/06																									
DEPTH (FT)	CORING (MINIFIT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS /6 INCH	N VALUE	SOIL PEN./REC.(IN/IN) ROCK PEN./REC.(FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT							
													HARDNESS					WEATHERING					see below for values							
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER			
35	4									R3: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures.																				
40	4	R4	37-42			5.0/5.0	100	100		R4: Hard, fresh, fine grained, gray MARBLE with very thin, sub-vertical foliation: smooth, very close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures.																				
45	4	R5	42-47			5.0/5.0	100	100		R5: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation: close to moderately close, sub-horizontal, slightly weathered, iron-oxide stained joints/fractures.																				
50	4	R6	47-52			5.0/5.0	100	95		R6: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: one smooth, wide, sub-horizontal to vertical, slightly weathered, joint/fracture.																				
55	3.5	R7	52-57			5.0/5.0	100	100		R7: Hard, fresh, fine grained white to gray MARBLE with faint, very thin, sub-vertical to convoluted foliation: one smooth, widely spaced, sub-horizontal, iron-oxide stained joint/fracture.																				
60	4	R8	57-62			5.0/5.0	100	100		R8: Hard, fresh, fine grained, light gray to white MARBLE with faint, very thin, to thin, convoluted to sub-vertical foliation: one rough, moderately close to wide, sub-vertical, iron-oxide stained joint/fracture.																				
GRANULAR SOILS			COHESIVE SOILS			ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS																			
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS				ANGLE		ATTITUDE													
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL																	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL																	
10-30	MEDIUM DENSE	4-6	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING																	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-65°	SUB-VERTICAL																	
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	65°-90°	VERTICAL																	
NOTES: 																														

BORING NO. MW-39

BORING LOG

SH. 3 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 81.83 feet NORTH: 462425.51
 DATUM: NGVD 1929 EAST: 604676.87
 FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig
 SAMPLER HAMMER: N/A
 CASING SIZE: 4-inch diameter (HW)
 CASING HAMMER: N/A
 ROCK CORE: 3 7/8-inch diameter (HQ)

BORING CO.: Aquifer Drilling and Testing
 FOREMAN: Doug Wood
 ENGINEER: Daniela Bastos/Maurice Ponti
 DATE START: 2/1/06
 DATE END: 2/10/06

GROUND WATER READINGS
 DATE DEPTH CASING STABILIZATION TIME
 Refer to Table 6.1 for Groundwater Data

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
65																											
65		R9	62-67			5.0/5.0	100	95		R9: Hard, fresh, fine grained gray MARBLE with faint, very thin, sub-vertical foliation: rough to smooth, close to moderately close, sub-vertical, iron-oxide stained joints/fractures; mylonized texture.																	
70																											
70		R10	67-72			5.0/5.0	100	100		R10: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: rough to smooth, close to moderately close, horizontal to sub-horizontal, iron-oxide stained joints/fractures; mylonized texture.																	
75																											
75		R11	72-77			5.0/5.0	100	100		R11: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, close to moderately close, sub-horizontal, iron-oxide stained joints/fractures.																	
80																											
80		R12	77-82			5.0/5.0	100	100		R12: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, close to moderately close, sub-horizontal, iron-oxide stained joints/fractures; mylonized texture.																	
85																											
85		R13	82-87			5.0/5.0	100	100		R13: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures.																	
90																											
90		R14	87-92			5.0/5.0	100	82		R14: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures; mylonized texture.																	
90																											

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-1" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1"-3" MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V.STIFF	5 VERY HARD	5 FRESH			>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD							

NOTES:

BORING LOG

SH. 4 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 81.83 feet NORTH: 462425.51
DATUM: NGVD 1929 EAST: 604676.87
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig

BORING CO.: Aquifer Drilling and Testing

SAMPLER HAMMER: N/A

FOREMAN: Doug Wood

CASING SIZE: 4-inch diameter (HW)

ENGINEER: Daniela Bastos/Maunce Ponti

CASING HAMMER: N/A

DATE START: 2/1/06

ROCK CORE: 3 7/8-inch diameter (HQ)

DATE END: 2/1/06

GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH (FT), BLOWS / 6 INCH, N VALUE, SOIL PEN. / REC. (IN / IN), ROCK PEN. / REC. (FT / FT), TOTAL CORE REC. (%), ROD (%), DRILLING FLUID LOSS (GALLONS), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Summary characteristics table with columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), JOINT/FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
2. RQD affected by one sub-vertical weathered joint/fracture between 99 and 100 feet

BORING NO. MW-39

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO.: 41.0017869.10	COORDINATES:
G. SURF. EL.: 81.83 feet	NORTH: 462425.51
DATUM: NGVD 1929	EAST: 604676.87
FINAL BORING DEPTH: 200 feet	

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N/A	FOREMAN: Doug Wood	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniela Bastos/Maurice Ponti	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N/A	DATE START: 2/1/06		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/10/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (TIFF)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
125	3																											0
	3																											0
	3	R21	122-127			5.0/5.0	100	95		R21: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth very close to wide, horizontal to sub-horizontal, iron-oxide stained joints/fractures; mylonized texture; 122.7'-124.5': Dissolution, pitted along healed calcified, joints/fractures.																		2
	4																											0
	3																											0
	3																											2
	3																											0
	4	R22	127-132			5.0/5.0	100	94		R22: Hard, fresh, fine grained, gray MARBLE with faint, very thin, convoluted to sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures; mylonized texture; disseminated pyrite clusters; 126.8'-128.9': Iron-oxide stained joints/fractures.																	1	
	3																											2
130	3																											0
	4																											1
	4																											1
	3	R23	132-137			5.0/5.0	100	100		R23: Hard, fresh, fine grained, gray MARBLE with faint very thin, convoluted to sub-vertical foliation: smooth to rough, moderately close to wide, moderately dipping, iron-oxide stained joints/fractures.																	0	
135	4																											1
	3																											0
	3																											0
	4	R24	137-142			5.0/5.0	100	100		R24: Hard, fresh, fine grained, gray MARBLE with faint, very thin, convoluted to sub-vertical foliation: smooth to rough, moderately close, moderately dipping, iron-oxide stained joints/fractures.																	0	
140	4																											0
	3																											1
	3																											0
	3	R25	142-147			5.0/5.0	100	100		R25: Hard, fresh, fine grained, light gray to gray MARBLE with faint, very thin, sub-horizontal foliation: smooth to rough, close to wide, horizontal to moderately dipping, iron-oxide stained joints/fractures.																	2	
145	3																											1
	4																											0
	4																											0
	3	R26	147-152			5.0/5.0	100	100		R26: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, wide, sub-vertical, iron-oxide stained joints/fractures; mylonized texture; slightly pitted along healed, calcified joints/fractures.																	0	
150	3																											1
	4																											0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS		
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0°-5° HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1" CLOSE/THIN	5°-35° SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK	35°-55° MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" WIDE/THICK	55°-85° SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK	85°-90° VERTICAL

NOTES:

BORING LOG

SH. 6 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 81.83 feet NORTH: 462425.51
DATUM: NGVD 1929 EAST: 604676.87
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N/A	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniele Bastos/Maurice Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N/A	DATE START: 2/1/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/10/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
3																											0
3																											0
3	R27		152-157			5.0/5.0	100	100		R27: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation; no apparent joints/fractures; slightly pitted and vuggy texture; pyritized.																	0
2																											0
155																											0
4																											0
3																											0
3																											0
4	R28		157-162			5.0/5.0	100	100		R28: Hard, fresh, fine grained, gray to white MARBLE with faint, very thin, sub-vertical foliation; smooth, moderately close to wide, slightly weathered, sub-vertical joints/fractures; 158.2'-160.5': Very hard, smokey gray quartz-rich zone.		3															1
10																											1
7																											0
160																											1
10																											0
10																											0
5	R29		162-167			5.0/5.0	100	100		R29: Moderately hard to hard, slightly weathered to fresh, fine grained gray MARBLE with faint, very thin, sub-vertical, foliation; no apparent joints/fractures.																	0
4																											0
165																											0
5																											0
4																											0
5																											0
5	R30		167-172			5.0/5.0	100	100		R30: Hard, fresh, fine grained, gray MARBLE with faint, very thin, convoluted foliation; smooth, moderately close, horizontal to moderately dipping, slightly weathered joints/fractures; disseminated pyrite.																	0
5																											0
170																											1
4																											1
3																											0
4																											0
2	R31		172-177			4.0/5.0	80	75		R31: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation; no apparent joints/fractures; slightly pitted texture; disseminated pyrite.																	0
3																											0
175																											0
3																											0
3																											0
4	R32		177-182			5.0/5.0	100	100		R32: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation; no apparent joints/fractures.																	0
3																											0
180																											0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN		0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-3"	CLOSE/THIN		5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK		35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK		55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK		85°-90°	VERTICAL	
		>30	HARD												

NOTES:
3. HQ rock coring difficult between 158 and 161 feet b.e.g.

BORING NO. MW-39

BORING LOG

SH. 7 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-39

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 81.83 feet NORTH: 462425.51
 DATUM: NGVD 1929 EAST: 604676.87
 FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER HAMMER: N.A.	FOREMAN: Doug Wood	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniela Bastos/Maurice Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N/A	DATE START: 2/1/06				
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/1/06				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (PI/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
185	4																										0	
	3																										0	
	4	R33	182-187			5.0/5.0	100	100		R33: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation: one, rough, wide, sub-vertical, slightly weathered joint/fracture; disseminated pyrite; slightly pitted texture.																1		
	3																										0	
	3																										0	
	3																										0	
	3																										0	
	3	R34	187-192			5.0/5.0	100	100		R34: Hard, fresh, fine grained, gray MARBLE with faint, very thin, vertical foliation: rough, very close to close, sub-horizontal to vertical, slightly weathered joints/fractures; healed, calcified fault breccia; disseminated pyrite; pitted vugular texture; 188.6'-189.9': Fractured zone, rough, very close, sub-horizontal to vertical slightly weathered joints/fractures.	FZ																5	
190	3																										9	
	3																										1	
	3																										0	
	4	R35	192-197			5.0/5.0	100	100		R35: Hard, fresh, fine grained, gray MARBLE with faint, very thin sub-vertical foliation: no apparent joints/fractures.																	0	
195	3																										0	
	3																										0	
	4																										0	
	4																										0	
	3	R36	197-200			3.0/3.0	100	100		R36: Hard, fresh, fine grained, gray MARBLE with faint, very thin sub-vertical foliation: one rough, wide, moderately dipping, slightly weathered joint/fracture.																	0	
200	4																										1	
	4																										0	
										End of Boring at 200 Feet		4																

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 4. Waterloo multi-level sampling system installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground sur

BORING LOG

SH. 2 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW-40

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL.: 74.95 feet NORTH: 461950.51
DATUM: NAVD 1929 EAST: 603899.35
FINAL BORING DEPTH : 200 feet

Table with 2 rows and 3 columns: DRILLING RIG MODEL, SAMPLER, CASING SIZE, CASING HAMMER, ROCK CORE; BORING CO., FOREMAN, ENGINEER, DATE START, DATE END; GROUND WATER READINGS (DATE, DEPTH, CASING, STABILIZATION TIME). Includes reference to Table 6.1 for Groundwater Data.

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH (FT), BLOWS / 6 INCH, N VALUE, SOIL PEN / REC (IN / IN) / ROCK PEN / REC. (FT / FT), TOTAL CORE REC (%), RQD (%), DRILLING FLUID LOSS (GALLONS), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Summary tables for SOILS, ROCK CORE CHARACTERISTICS, and JOINT/FRACTURE CHARACTERISTICS.

NOTES section and BORING NO. MW-40 label.

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW-40

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL. 74.95 feet NORTH: 461950.51
DATUM: NGVG 1929 EAST: 603899.35
FINAL BORING DEPTH : 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Doug Wood	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas/Daniela Bastos/David Winslow/Maurice Ponti	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 1/20/06		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 1/30/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
95		R18	91-96			5.0/5.0	100	100		R18: Hard, fresh, fine grained, MARBLE, with faint, very thin, sub-vertical foliation: smooth, very close to moderately close, moderately dipping to sub horizontal, iron-oxide stained joints/fractures.																		
		R19	96-101			5.0/5.0	100	90		R19: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, foliation: smooth, very close to moderately close, moderately to sub-vertical, iron-oxide stained joints/fractures;	FZ																2	
100										97.0'-105.0': Healed brecciated with penetrative iron stains on fractures and closely spaced, sub-vertical, friable fractures; 97.8'-98.4': Smooth to rough, very close, moderate to subvertical, iron-oxide stained fractured zone: fractures, joints/dissolution surfaces, recovered as gravel size angular fragments.	FZ																	5
		R20	101-106			5.0/5.0	100	84		R20: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, sub-vertical foliation: rough to smooth, very close to moderately close, sub-vertical, iron-oxide stained joints/fractures; 104.4'-105.0': Fractured zone, rough, close, sub-vertical, iron-oxide stained joints/fractures.																	2	
105											FZ																	3
		R21	106-111			5.0/5.0	100	100		R21: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, sub-vertical foliation: no apparent joints/fractures; Healed, very close, subvertical calcite veins.																	0	
110																												0
		R22	111-116			5.0/5.0	100	100		R22: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, sub-vertical foliation, no apparent joints/fractures.																		0
115																												0
		R23	116-121			5.0/5.0	100	100		R23: Hard, fresh, fine grained, gray, MARBLE with faint, very thin, sub-vertical foliation, no apparent joints/fractures; 117.1'-119.0': Calcite healed highly brecciated, with fine grained, gray, very thin subvertical micro-mylonized zone at 188.6'.																		0
120																												0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT			SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/EVERY THIN		0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN		5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK		35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK		55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK		85°-90°	VERTICAL	

NOTES:

BORING NO. MW-40

BORING LOG

SH. 6 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW- 40

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017889.00 COORDINATES:
G. SURF. EL. 74.95 feet NORTH: 461950.51
DATUM: NGVG 1929 EAST: 603899.35
FINAL BORING DEPTH : 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Doug Wood	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas/Daniela Bastos/David Wnslow/Maurice Ponti	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 1/20/06		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 1/30/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
155		R30	151-156			5.0/4.8	96	96		R30: Hard, fresh, fine grained, gray, subvertical MARBLE with faint, very thin, sub-vertical foliation: one smooth, wide, slightly weathered joint/fracture; 153.8' Undulating, smooth sub-vertical fracture, pitted surface with pyrite mineralization.																	0	
160		R31	156-161			5.0/5.0	100	100		R31: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, sub-vertical foliation: no apparent joints/fractures. 158.0'-160.0': Healed brecciated appearance.																	0	
165		R32	161-166			5.0/5.0	100	100		R32: Hard, fresh, fine grained, gray, MARBLE, with faint, very thin, sub-vertical foliation: two smooth, close, sub-vertical, slightly weathered joints/fractures.																	2	
170		R33	166-171			5.0/2.2	44	16		R33: Hard to very hard, fresh, fine grained, gray, MARBLE, very thin, faint, sub-horizontal to sub-vertical foliation: smooth, very close to close, sub-horizontal to vertical, slightly weathered joints/fractures. 168.5'-170': Fractured zone: smooth, very close, sub-horizontal to vertical, slightly weathered joints/fractures.	2																0	
175		R34	171-176			5.0/5.0	100	100		R34: Hard, fresh, fine grained, gray, MARBLE, with very thin, sub-vertical, foliation, no apparent joints/fractures.	FZ																3	
180		R35	176-181			5.0/5.0	100	100		R35: Hard, fresh, fine grained, gray, MARBLE, with very thin, sub-vertical foliation: one smooth wide, moderately dipping, slightly weathered joint/fracture; 180.5'-181.0': Healed, thin, convoluted foliation zone.	FZ																1	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS				ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V.STIFF	5 VERY HARD	5 FRESH		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		
		>30	HARD									

NOTES:
2. Low recovery and ROD likely due to drilling activities. NA indicates no data available

BORING LOG

SH. 7 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-40

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.00 COORDINATES:
G. SURF. EL. 74.95 feet NORTH: 461950.51
DATUM: NGVG 1929 EAST: 603899.35
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig BORING CO.: Aquifer Drilling and Testing
SAMPLER: Split Spoon FOREMAN: Doug Wood
CASING SIZE: 4-inch diameter (HW) ENGINEER: Anton Gallus/Daniela Bastos/David Winslow/Maurice Ponti
CASING HAMMER: N.A. DATE START: 1/20/06
ROCK CORE: 3 7/8-inch diameter (HQ) DATE END: 1/30/06

GROUND WATER READINGS

DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	Rod (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT										
													HARDNESS					WEATHERING					see below for values					
													see below for values					see below for values					see below for values					
					1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER									
185		R36	181-186			5.0/5.0	100	100		R36: Hard, fresh, fine grained, gray MARBLE, with very thin, sub-vertical foliation; no apparent joints/fractures; very thin to thin discontinuous convoluted zones.																		0
190		R37	186-191			5.0/5.0	100	100		R37: Hard, fresh, fine grained, gray, MARBLE, with very thin, sub-vertical foliation: smooth, wide, sub-horizontal to moderately dipping, slightly weathered joints/fractures; few very thin, discontinuous convoluted zones; 187.0'-198.3': Healed, calcified, brecciated appearance.																		1
195		R38	191-196			5.0/5.0	100	100		R38: Hard, fresh, fine grained, gray, MARBLE with faint, very thin, sub-vertical foliation: one smooth, wide, sub-horizontal, slightly weathered. joint/fracture.																		0
200		R39	196-200			4.0/4.0	100	100		R39: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation: no apparent joints/fractures; very thin, discontinuous, healed, micro-breccia; trace pitted texture along calcite healed joints/fractures.																		1
										End of Boring at 200 ft.		3																0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2'-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:
3. Waterloo Multi-level Sampling System installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surf

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-42

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 69.71 feet NORTH: 462750.33
 DATUM: NGVD 1929 EAST: 604857.50
 FINAL BORING DEPTH: 80.0 feet

DRILLING RIG MODEL: CME L55 Track Rig SAMPLER HAMMER: Split Spoon CASING SIZE: 4-inch diameter (HW) CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ)	BORING CO.: Aquifer Drilling and Testing FOREMAN: Doug Wood ENGINEER: Daniela Sastoa DATE START: 3/14/08 DATE END: 3/18/08
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GROUND WATER READINGS			
DATE	DEPTH	CASING	STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN/IN) ROCK PEN./REC. (F/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
5										(No Soil Samples Taken from 0 to 10 feet)																		
10		S1	10-12	19 - 14	28	24/4				S1: Medium dense gray fine to coarse GRAVEL, and Sand, trace Silt. (no water return during drilling)																		
15		S2	15-17	6 - 5	9	24/4				S2: Medium dense gray fine to coarse GRAVEL, some Sand, little Silt.																		
20		S3	20-22	6 - 8	15	24/2				S3: Medium dense gray fine to coarse GRAVEL, little Sand, little Silt. (no water return during drilling)																		
25										Top of Bedrock at approximately 25 feet		1																
5		R1	26-31			5.0/5.0	100	10		R1: Medium hard to hard, fresh to slightly weathered, fine grained, white MARBLE with very thin, sub-horizontal to sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.	FZ															7		
5											FZ																	7
3											FZ																	3
5											FZ																	10

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	>1	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	>2	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	>3	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>4	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD								

NOTES:
 1. Vacuum excavation performed from 0 to 10 feet. Spun and washed HW casing to sampling depths from 10 to 20 feet. Spun and washed casing to 26 feet. Bedrock encountered at 25 feet. Interface sealed with gr...

BORING LOG

SH. 3 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW- 42

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 69.71 feet NORTH: 462750.33
DATUM: NGVD 1929 EAST: 604857.50
FINAL BORING DEPTH: 80.0 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: Split Spoon	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniela Bastos	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 3/14/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 3/16/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N. VALUE	SOIL PEN. / REC. (IN./IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
60	5																										4
	5	R8	61-66			5.0/5.0	100	92		R8: Hard, fresh to slightly weathered, fine grained, light gray to white MARBLE with faint, very thin moderate dipping foliation: rough, close to moderately close, horizontal to sub-vertical, iron-oxide stained joints/fractures; healed breccia; 62.8' - 65.2': Pitted texture with vugs along calcite mineralized joints/fractures.																	1
	4																										1
	4																										0
65	3																										2
	8																										5
	4	R9	66-71			5.0/5.0	100	100		R9: Hard, fresh, fine grained, light gray MARBLE with no apparent foliation: smooth to rough, close to wide, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.																	0
	4																										1
	6																										0
70	4																										0
	4			19 - 14																							2
	4	R10	71-76	14 - 7		5.0/5.0	100	92		R10: Hard, fresh, fine grained, light gray MARBLE with faint very thin, moderately dipping foliation: smooth to rough, very close to moderately close, horizontal to moderately dipping, slightly weathered, iron-oxide stained joints/fractures.																	1
	4																										1
	4																										0
75	5																										2
	4			6 - 5																							1
	3	R11	76-80	4 - 2		4.0/4.0	100	98		R11: Hard, fresh, light gray MARBLE with faint very thin to thin, moderately dipping foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.																	0
	5																										0
	4																										1
80	4									End of Boring at 80 feet																	2
				6 - 8																							
				7 - 9																							
85																											
90																											

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/FIN	5°-30°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	30°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH	(5)		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:
2. Monitoring wells installed within borehole (refer to installation log for details); 12" diameter well vault installed within concrete, flush with the ground surf

BORING NO. MW-42

BORING LOG

SH. 1 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW- 43

Reviewed by: M. A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.00 COORDINATES:
 G. SURF. EL.: 48.76 feet NORTH: 462192.60
 DATUM: NGVG 1929 EAST: 604429.78
 FINAL BORING DEPTH: 65 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Dave Carter	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW)	ENGINEER: Anton Gallas	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 2/18/06		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/24/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC.(IN/IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
5																											
10																											
15																											
16		S1	16-18	3 - 4	10	24/24	100			S1: Stiff, brown, clayey SILT.																	
17				6 - 7																							
20																											
25																											
26		S2	25-27	WOH	1	4	24/24	100		S2: Loose, brown SILT.																	
27				3 - 3																							

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS		
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-4" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK	35°-65°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD						

NOTES:
 1. Performed 8-inch diameter vacuum excavation from 0 to 6 feet
 2. Spun and washed 4-inch diameter (HW) casing from 6 to 16 feet
 3. Removed HW casing and installed 6-inch diameter (SW) casing. Spun and washed SW casing to sampling depths from 16 to 35 feet

BORING LOG

SH. 3 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-43

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017889.00 COORDINATES:
G. SURF. EL. 48.76 feet NORTH: 462192.60
DATUM: NGV9 1929 EAST: 604429.78
FINAL BORING DEPTH: 65 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER: Split Spoon	FOREMAN: Dave Carter	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW)	ENGINEER: Anton Gallas	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 2/18/06				
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 2/24/06				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT					
													HARDNESS					WEATHERING						NO. OF FRACTURES PER FOOT				
													see below for values					see below for values						see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
3																											0	
3																											0	
3		R6	62.5 - 65.0			2.5/2.5	100	97		R6: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-horizontal foliation; no apparent joints/fractures.																	0	
3																											0	
65										End of Boring at 65.0'		6															0	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1"-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3"-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD								Very Wide		

NOTES:
6. Monitoring wells installed within the borehole (refer to installation log for details); 12" diameter well vault installed within concrete, flush with ground surf.

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. 44

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10

COORDINATES:

G. SURF. EL. 93.52 feet

NORTH: 462499.91

DATUM: NGVG 1929

EAST: 604516.43

FINAL BORING DEPTH: 105 feet

DRILLING RIG MODEL: CME 55 Truck Rig

BORING CO.: Aquifer Drilling and Testing

GROUND WATER READINGS

SAMPLER: Split Spoon

FOREMAN: Doug Wood

DATE

DEPTH

CASING

STABILIZATION TIME

CASING SIZE: 4-inch diameter (HW)

ENGINEER: Daniela Bastos/Rick Ponti

Refer to Table 6.1 for Groundwater Data

CASING HAMMER: N.A.

DATE START: 3/06/06

ROCK CORE: 3 7/8-inch diameter (HQ)

DATE END: 3/10/06

DEPTH (FT.)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
5																											
10		S1	8-10	2 - 3	7	24/4				S1: Loose, brown and gray, fine to coarse SAND, and Gravel, trace Silt. (fill)	1																
				4 - 3							2																
15																											
20		S2	18-20	3 - 6	10	24/4				S2: Loose, brown and gray, fine to coarse SAND, and Gravel, trace Silt. (fill)																	
				4 - 14																							
25																											
30		S3	28-28.6	34 - 60/1	>100	7/5				S3: Very dense, gray, fine to coarse GRAVEL, some Sand, little Silt, piece of gravel on tip of spoon.	3																

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS	
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT.	SPACING/THICKNESS
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-4" CLOSE/THIN
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" WIDE/THICK
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK
		>30	HARD				
ANGLE		ATTITUDE					
0°-5°		HORIZONTAL					
5°-35°		SUB-HORIZONTAL					
35°-55°		MOD DIPPING					
55°-85°		SUB-VERTICAL					
85°-90°		VERTICAL					

- NOTES:
- Performed 8-inch diameter vacuum excavation from 0 to 8 feet and took S-1.
 - Spun and washed 4-inch diameter (HW) casing to sampling depths from 8 to 34 feet.
 - Bedrock encountered at approximately 31 feet.

BORING LOG

SH. 2 OF 4



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. 44

Rev. 1 - MAP

Reviewed by: M.A. Pontl, Jr. - D. Schipper	
PROJECT NO: 41.0017869.00	COORDINATES:
G. SURF. EL. 93.52 feet	NORTH: 462499.81
DATUM: NGVG 1929	EAST: 604516.43
FINAL BORING DEPTH: 105 feet	

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Daniela Bastos/Rick Ponti	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 3/06/06		
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 3/10/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
													HARDNESS					WEATHERING					see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
										Top of bedrock at approximately 31 feet																
35																										
36	2	R1	36-41			5.0/5.0	100	50		R1: Fracture zone. Hard, fresh, fine grained, gray to white MARBLE with faint, very thin to thin, sub-vertical foliation: smooth, very close, horizontal to sub-vertical, iron-oxide stained joints/fractures;	FZ									4						
37	3.5																			2						
38	3.5																			3						
39	4																			3						
40	4																			8						
41	4																			0						
42	4	R2	41-46			5.0/5.0	100	84		R2: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures;										2						
43	5									43.0'-45.0': Fracture zone, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ									2						
44	4																			4						
45	4																			1						
46	4																			0						
47	4	R3	46-51			5.0/5.0	100	72		R3: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, silt coated, iron-oxide stained joints/fractures; mylonized texture;										0						
48	5																			0						
49	5									49.5' - 51.0': Fracture zone, smooth to rough, very close, sub-horizontal to sub-vertical, silt coated, iron-oxide stained joints/fractures.	FZ									5						
50	5																			>10						
51	6	R4	51-56			5.0/4.0	80	40		R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to sub-vertical iron-oxide stained joints/fractures; mylonized texture;	FZ									ND						
52	6.5									54.0' - 56.0': Fracture zone, smooth, very close, sub-horizontal to vertical, iron-oxide stained joints/fractures.	FZ									2						
53	6																			2						
54	5																			>10						
55	6																			8						
56	3.5	R5	56-61			5.0/5.0	100	68		R5: Hard, fresh, fine grained, tan-white MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to moderately close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures.										3						
57	4																			2						
58	4																			0						
59	4																			0						
60	4																			0						

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING	NO. PER FT		SPACING/THICKNESS	ANGLE	ATTITUDE		
0.4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	VERY STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:

4. Spun and washed casing to 34 feet and sealed casing into bedrock with grout.

BORING NO. MW-44

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. 44

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO.: 41.0017869.00
COORDINATES:
G. SURF. EL.: 93.52 feet NORTH: 482499.91
DATUM: NGVG 1929 EAST: 604516.43
FINAL BORING DEPTH: 105 feet


Table with 4 columns: DRILLING RIG MODEL, SAMPLER, CASING SIZE, CASING HAMMER, ROCK CORE, BORING CO., FOREMAN, ENGINEER, DATE START, DATE END, and GROUND WATER READINGS (DATE, DEPTH, CASING, STABILIZATION TIME).

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH (FT), BLOWS / 6 INCH., N VALUE, SOIL PEN. / REC. (IN / IN), ROCK PEN./REC. (FT/FT), TOTAL CORE REC (%), RQD (%), DRILLING FLUID LOSS (GALLONS), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), and NO. OF FRACTURES PER FOOT.

Summary table with columns: GRANULAR SOILS (BPF, DENSITY), COHESIVE SOILS (BPF, CONSISTENCY), ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING, NO PER FT), and JOINT/FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
5. Monitoring wells installed within the borehole (refer to installation log for details); 12" diameter well vault installed within concrete, flush with ground surface.

BORING LOG

								Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY			BORING NO. MW-45																
DRILLING RIG MODEL: CME 55 Truck Rig SAMPLER HAMMER: N.A. CASING SIZE: 4-inch diameter (HW) CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ)								BORING CO.: Aquifer Drilling and Testing FOREMAN: Dave Carter ENGINEER: Anton Galias DATE START: 3/20/06 DATE END: 3/24/06			Reviewed by: M.A. Pantli, Jr. - D. Schipper PROJECT NO: 41.0017869.00 G. SURF. EL. 53.66 feet DATUM: NGVG 1929 FINAL BORING DEPTH: 65 feet COORDINATES: NORTH: 462385.52 EAST: 604471.96																
DEPTH (FT.)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC (IN / IN)	ROCK PEN / REC (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES													
														HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT			
														see below for values					see below for values					see below for values			
														1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4	NUMBER										
5																											
10																											
11.5		R1	16.5			5.0/1.5	30	0			R1: Boulders and Marble rock fragments.																
15											Top of bedrock at approximately 15 feet																
16.5		R2	20.5			4.0/3.9	97	87			R2: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-horizontal foliation: smooth, very close to moderately close, horizontal to sub-horizontal iron-oxide stained joints/fractures.	2							0								
20.5																											
20.5		R3	25.5			5.0/5.0	100	85			R3: Hard, fresh, fine grained, gray MARBLE with faint very thin, sub-horizontal foliation: smooth, very close to wide, moderately dipping to sub-vertical iron-oxide stained joints/fractures; 22.6'-24.2': light gray - marble zone;								4								
25																											
25.5		R4	30.5			5.0/5.0	100	90			R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-horizontal foliation: smooth to rough, very close to wide, sub-horizontal, slightly weathered, iron-oxide stained joints/fractures. 26.8' - 28.3' Fracture zone: smooth to rough, very close to wide, sub-horizontal, slightly weathered, iron-oxide stained-joints/fractures.	FZ							0								
30																											

GRANULAR SOILS				COHESIVE SOILS				ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	1	VERY SOFT	HARDNESS	WEATHERING	NO PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE	1	COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
0-4	VERY LOOSE	<2	VERY SOFT	2	MEDIUM	2	SEVERE	(2) 1-2	2"-1' CLOSE/THIN	5°-35°	SUB-HORIZONTAL	3	MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
4-10	LOOSE	2-4	SOFT	3	MODERATELY HARD	3	MODERATE	(4) 11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL	4	HARD	(4)	10°-15° WIDE/THIN	85°-90°	VERTICAL
10-30	MEDIUM DENSE	4-8	M. STIFF	4	HARD	4	SLIGHT		>10" VERY WIDE/VERY THICK			5	VERY HARD				
30-50	DENSE	8-15	STIFF	5	VERY HARD	5	FRESH										
>50	VERY DENSE	15-30	V. STIFF														
		>30	HARD														

NOTES:

- Performed 8-inch diameter vacuum excavation from 0 to 6 feet. Spun and washed 4-inch diameter (HW) casing from 6 to 11.5 feet and took R1.
- Spun and washed casing to 16.5 feet (top of bedrock at 15 feet). Interface sealed with grout to stabilize casing.

BORING NO.	MW-45
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BORING LOG

SH. 3 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-45

Reviewed by: M.A. Pontil, Jr. - D. Schipper
 PROJECT NO: 41.0017869.00 COORDINATES:
 G. SURF. EL. 53.66 feet NORTH: 462385.52
 DATUM: NGVG 1929 EAST: 604471.96
 FINAL BORING DEPTH: 65 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS		
SAMPLER HAMMER: N.A.	FOREMAN: Dave Carter	DATE DEPTH CASING STABILIZATION TIME		
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas	Refer to Table 6.1 for Groundwater Data		
CASING HAMMER: N.A.	DATE START: 3/20/06			
ROCK CORE: 3 7/8-inch diameter (HO)	DATE END: 3/24/06			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																					
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT											
													see below for values					see below for values					see below for values											
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER							
60	2	R11	60.5-65.5			5.0/5.0	100	98		R11: Hard, fresh, fine grained, white to dark gray MARBLE with no apparent foliation; two, rough, close, sub-vertical, slightly weathered, iron-oxide stained joints/fractures.																							7	
	2																																	0
	2																																	0
	2.5																																	0
65	3																																	0
										End of Boring at 65.5 ft.			4																					

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10"	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL	
		>30	HARD								

NOTES:
 4. Monitoring wells installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with ground surface.

BORING NO. MW-45

BORING LOG

SH. 1 OF 3



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW- 47

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10

COORDINATES:

G. SURF. EL. 70.32 feet

NORTH: 462664.08

DATUM: NGVD 1929

EAST: 604651.13

FINAL BORING DEPTH: 80 feet

DRILLING RIG MODEL: CME L55 Track Rig

BORING CO.: Aquifer Drilling and Testing

GROUND WATER READINGS

SAMPLER HAMMER: N.A.

FOREMAN: Dave Carter

DATE

DEPTH

CASING

STABILIZATION TIME

CASING SIZE: 8-inch diameter (SW)

ENGINEER: Anton Gallas/ Daniela Bastos

Refer to Table 6.1 for Groundwater Data

CASING HAMMER: N.A.

DATE START: 2/28/06

ROCK CORE: 3 7/8-inch diameter (HQ)

DATE END: 3/3/06

Main data table with columns for depth, coring, sample depth, blows, N value, soil pen/rec, rock pen/rec, total core rec, rod, drilling fluid loss, sample description, fractured zone observed, notes, in situ properties (hardness, weathering), and no. of fractures per foot.

Soil and Rock Core Characteristics tables. Includes GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (Hardness and Weathering), and JOINT/FRACTURE CHARACTERISTICS (Spacing/Thickness, Angle, and Attitude).

NOTES:
1. Performed 8-inch diameter vacuum excavation to 6 feet. Spun and washed 8-inch diameter (SW) casing from 6 to 14 feet. Bedrock encountered at about 13 feet. SW casing set into the bedrock with grout.

BORING NO. MW-47

BORING LOG

SH. 1 OF 2



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-48

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 15.39 feet NORTH: 462015.66
DATUM: NGVD 1929 EAST: 603473.78
FINAL BORING DEPTH (FT): 40 feet

DRILLING RIG MODEL: CME 55 Truck Rig		BORING CO.: Acquirer Drilling and Testing		DATE		DEPTH		CASING		STABILIZATION TIME	
SAMPLER: Split Spoon		FOREMAN: Doug Wood		Refer to Table 6.1 for Groundwater Data							
CASING SIZE: 4-inch diameter (HW)		ENGINEER: Anton Gallas									
CASING HAMMER: N.A.		DATE START: 1/26/06									
ROCK CORE: 3 7/8-inch diameter (HQ)		DATE END: 1/27/06									

DEPTH (FT)	CASING (BPF)/ CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN/REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT					
													HARDNESS						WEATHERING				
													see below for values						see below for values				
													1, 2, 3, 4, 5.	1, 2, 3, 4, 5.	1, 2, 3, 4.	NUMBER							
5																							
10		S1	9-11	3 - 25	35	24/14				S1: Dense, light grey fine to coarse GRAVEL, trace fine to medium Sand (FILL).													
				10 - 7																			
15																							
20		S2	19-21	3 - 2	24	24/18				S2: 19.0' - 20.1': Dark gray wet SILT, some fine gravel. 20.1' - 21.0' fine to coarse light gray GRAVEL, some fine to coarse wet Sand (FILL).		1											
				22 - 22																			
25		3	R1	25-30		5.0/4.5	90	13		R1: Hard, fresh, fine grained gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to close, horizontal to vertical, iron-oxide stained joints/fractures; 25.0'-37.6': Fracture zone, smooth to rough, very close to close, horizontal to vertical, iron-oxide stained joints/fractures.	FZ						3						
		2									FZ							4					
		3									FZ							7					
		2.5									FZ							14					
30		10									FZ							12					

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-3	2'-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	2-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	10-20	3'-10'	WIDE/THICK	55°-65°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10'	VERY WIDE/VERY THICK	65°-90°	VERTICAL

NOTES:
1. Performed 8-inch diameter vacuum excavation to 5 feet. Spun and washed 4-inch diameter (HW) casing to sampling depths from 5 to 19 feet.
2. Spun and washed HW casing from 19 to 25 feet (top of bedrock). Casing removed after well completion

BORING NO. MW-48

BORING LOG

SH. 2 OF 2



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW- 48

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017889.10 COORDINATES:
G. SURF. EL. 15.39 feet NORTH: 462015.66
DATUM: NGVD 1929 EAST: 603473.78
FINAL BORING DEPTH (FT): 40 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Doug Wood	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gattaa	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 1/26/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 1/27/06		

DEPTH (FT)	CASING (BPF) / CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN)	ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED.	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT					
														HARDNESS					WEATHERING						NO. OF FRACTURES PER FOOT				
														see below for values					see below for values						see below for values				
														1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
35		R2	30-35			5.0/5.0		100		23	R2: Hard, slightly weathered to fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, horizontal to vertical, slightly weathered joints/fractures.																	8	
																													4
																													7
																													>10
																													>10
40		R3	35-40			5.0/5.0		100		58	R3: Hard, slightly weathered to fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, horizontal to vertical, iron-oxide stained joints/fractures.																	>10	
																													2
																													5
																													0
																													0
											End of Boring at 40 feet																		3

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-3	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	2-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	10-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:
 3. Monitoring wells installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with ground surf.
 2. Spun and washed HW casing from 19 to 25 feet (top of bedrock). Casing removed after well completion

BORING LOG

SH. 1 OF 3



**Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY**

BORING NO. MW-49

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.58 feet NORTH: 463080.21
DATUM: NGVG 1929 EAST: 604445.56
FINAL BORING DEPTH: 65 feet

DRILLING RIG MODEL: Davie DK515 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Dave Carter	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 3/13/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ)	DATE END: 3/16/06		

DEPTH (FT)	CORING / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (F / FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
												HARDNESS					WEATHERING					see below for values			
												1	2	3	4	5	1	2	3	4	5	1	2	3	4
5									(No Soil Samples taken from 0 to 10 feet)																
10	S1	10-12	9 - 16	22	24/6				S1: Dense, moist, moderately weathered gray MARBLE. (Fill)																
15	S2	15.0-16.3	28 - 86	100	16/6				S2: Very dense, slightly weathered to fresh, fragments of gray MARBLE, and white Limestone.																
20	S3	20-22	5 - 3	5	24/4				S3: Loose, fine, reddish gray GRAVEL (Fill).																
25	S4	25-27	100/4"	100	0.3/0.1				S4: Very dense, fresh, gray MARBLE fragments.																
30	S5	30.0-30.1	100/1"	100	0.1/0.1				S5: Very dense, wet, gray MARBLE fragments.																

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-11" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1"-5" MOD. CLOSE/MOD THICK	35°-55°	MOD. DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:
1. Performed 8-inch diameter vacuum excavation from 0 to 5 feet. Spun and washed 4-inch diameter (HW) casing to sampling depths from 5 to 30 feet. Top of weathered bedrock encountered at approximately 23 feet.

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW-50

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10

COORDINATES:

G. SURF. EL. 14.92 feet

NORTH: 463039.18

DATUM: NGVD 1929

EAST: 604494.30

FINAL BORING DEPTH: 67 feet

DRILLING RIG MODEL: CME L55 Track rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Dave Carter	DATE	CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas/Maurice Ponti	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 3/7/06		
ROCK CORE: 3 7/8-inch diameter (HQ) Wireline/Non-wireline	DATE END: 3/13/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 8 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
													HARDNESS						WEATHERING							
													see below for values						see below for values					see below for values		
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
3																		15								
3																		10								
35		R6	32-37			5.0/2.4	48	0		R6: Hard, fresh to slightly weathered, fine grained, gray MARBLE, with no apparent foliation; very close, smooth, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.								20								
2																		20								
3																		10								
40																		20								
2																		15								
3		R7	37-42			5.0/2.3	47	0	4	R7: Hard to medium hard, fresh to moderately weathered, fine grained, gray MARBLE, with no apparent foliation; smooth, very close, sub-vertical to vertical iron-oxide stained joints/fractures.	FZ							6								
3																		15								
4																		15								
4																		15								
4																		15								
45										R8: No recovery.								NA								
2		R8	42-47			5.0/0.0	0	0										NA								
3																		NA								
3																		NA								
7																		NA								
3																		NA								
3		R9	47-52			5.0/0.0	0	0		R9: No recovery.	FZ							NA								
3																		NA								
3																		NA								
50																		NA								
6																		NA								
5																		NA								
2		R10	52-57			5.0/0.0	0	0		R10: No recovery.	FZ							NA								
4																		NA								
55																		NA								
3																		NA								
3																		NA								
4																		NA								
3		R11	57-62			5.0/5.0	100	82		R11: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation; smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures; slightly pitted texture along healed calcite weathered joints/fractures.	FZ							3								
4																		1								
3																		6								

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING			NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V.STIFF	5	VERY HARD	5	FRESH			>10'	85°-90°	VERTICAL	
		>30	HARD										

NOTES:
5. Driller switch back to 3 7/8-inch diameter (HQ) wireline core barrel. HQ wireline core barrel used from 37 to 67 feet.
6. Split spoon sample in this zone indicated the presence of clay fault gouge.

BORING LOG

SH. 3 of 3



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW-50

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.92 feet NORTH: 463039.18
DATUM: NGVD 1929 EAST: 604494.30
FINAL BORING DEPTH: 67 feet


Table with fields: DRILLING RIG MODEL, SAMPLER HAMMER, CASING SIZE, CASING HAMMER, ROCK CORE, BORING CO., FOREMAN, ENGINEER, DATE START, DATE END, GROUND WATER READINGS, DATE, CASING, STABILIZATION TIME. Includes reference to Table 6.1 for Groundwater Data.

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 8 INCH, N VALUE, SOIL PEN. / REC. (IN / IN), ROCK PEN./REC. (PT/FT), TOTAL CORE REC (%), RQD (%), Drilling Fluid Loss (Gallons), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT. Includes sample data for R11 and R12.

Reference table for soil types and characteristics. Columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING, NO. PER FT), JOINT/FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:

6. Monitoring wells installed within the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.

BORING LOG														SH. 1 OF 7													
			Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY					BORING NO. MW - 51 Reviewed by: M.A. Ponti, Jr. - D. Schipper PROJECT NO: 41.0017869.10 COORDINATES: G. SURF. EL.: 69.64 feet NORTH: 461822.43 DATUM: NGVD 1929 EAST: 604275.34 FINAL BORING DEPTH: 200 feet																			
								DRILLING RIG MODEL: CME 55 Truck rig SAMPLER: Split Spoon CASING SIZE: 4-inch diameter (HW) CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ) wireline				BORING CO.: Aquifer Drilling and Testing FOREMAN: Doug Wood ENGINEER: Daniela Bastos DATE START: 3/23/06 DATE END: 3/28/06				GROUND WATER READINGS DATE DEPTH CASING STABILIZATION TIME Refer to Table 6.1 for Groundwater Data											
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	Number
5										(No Soil Samples taken from 0 to 10 feet)																	
10										Top of Bedrock at 10 feet																	
		S1	10 - 10.2	100/2"		2/0				S1: No recovery, piece of gravel on tip of spoon.																	
15	1.5	R1	11-16			5.0/2.3	46	0		R1: Hard, fresh, fine grained, white MARBLE with no apparent foliation: smooth to rough, very close, horizontal to vertical, slightly weathered, iron-oxide stained joints/fractures;	FZ																NA
	1.5									11.0'-14.5': Fracture zone, smooth to rough, very close, horizontal to vertical, slightly weathered.	FZ																NA
	1.5										FZ																NA
	2										FZ																10
	2	R2	16-21			5.0/5.0	100	68		R2: Hard, fresh, fine grained, white MARBLE with very thin, convoluted sub-horizontal to sub-vertical foliation: smooth to rough, very close to close, horizontal to sub-vertical dipping, iron-oxide stained joints/fractures.																	3
	3																										3
	2																										3
20	4																										3
	2																										0
	3	R3	21-26			5.0/5.0	100	74		R3: Hard, fresh, fine grained, light gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to wide, horizontal to vertical, iron-oxide stained joints/fractures.																	0
	4																										3
	2																										1
25	3																										1
	3																										2
	2	R4	26-31			5.0/5.0	94	86		R4: Moderately hard to hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to wide, horizontal to sub-vertical iron-oxide stained joints/fractures.																	0
	2																										1
	2																										1
	3																										3

NOTES:

1. Performed 8-inch diameter vacuum excavation from 0 to 9 feet. Drove and washed 4-inch diameter (HW) casing to sampling depths from 9 to 11 feet. Top of bedrock at 10 feet.

BORING LOG

SH. 2 OF 7



Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 51

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
COORDINATES:
G. SURF. EL. 69.64 feet NORTH: 481822.43
DATUM: NGVD 1929 EAST: 604275.34
FINAL BORING DEPTH: 200 feet

Table with 2 columns: Drilling Rig Model (CME 55 Truck rig), Boring Co. (Aquafer Drilling and Testing) and Groundwater Readings (DATE, DEPTH, CASING, STABILIZATION TIME).

Main data table with columns for Depth (FT), Coring / Core No., Sample Depth (FT), Blows / 6 INCH, N Value, Soil Pen. / Rec. (IN/IN) Rock Pen./Rec. (PI/FT), Total Core Rec (%), RQD (%), Drilling Fluid Loss (Gallons), Sample Description, Fractured Zone Observed, Notes, In Situ Properties (Hardness, Weathering), and No. of Fractures per Foot.

Summary table with columns: Granular Soils (BPF, Density), Cohesive Soils (BPF, Consistency), Rock Core Characteristics (Hardness, Weathering, NO. PER FT), and Joint/Fracture Characteristics (Spacing/Thickness, Angle, Attitude).

NOTES section containing blank space for additional information.

BORING NO. MW-51

BORING LOG

SH. 3 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 51

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 69.64 feet NORTH: 461822.43
DATUM: NGVD 1929 EAST: 604275.34
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig
BORING CO.: Aquifer Drilling and Testing
SAMPLER: Split Spoon FOREMAN: Doug Wood
CASING SIZE: 4-inch diameter (HW) ENGINEER: Daniela Bastos
CASING HAMMER: N.A. DATE START: 3/23/06
ROCK CORE: 3 7/8-inch diameter (HQ) wireline DATE END: 3/28/06

GROUND WATER READINGS			
DATE	DEPTH	CASING	STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	RQD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
65	3	R11	61-66			5.0/5.0	100	76		R11: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to wide, moderately dipping to vertical, iron-oxide stained joints/fractures.			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	2																										
	3																										
	3																										
70	3	R12	66-71			5.0/5.0	100	100		R12: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical foliation: smooth, close to wide, sub-horizontal dipping, iron-oxide stained joints/fractures.																	
	3																										
	3																										
	3																										
75	2	R13	71.0-76.0			5.0/5.0	100	100		R13: Hard, fresh, fine grained, white to light gray MARBLE with faint, very thin, sub-vertical foliation: smooth, close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained joints/fractures.																	
	3																										
	3																										
	3																										
80	2	R14	76-81			5.0/5.0	100	100		R14: Hard, fresh, fine grained light gray MARBLE with faint, very thin, sub-vertical foliation: smooth, moderately close to wide, moderately dipping, iron-oxide stained joints/fractures.																	
	3																										
	3																										
	3																										
85	3	R15	81-86			5.0/5.0	100	82		R15: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to wide, vertical to moderately dipping, iron-oxide stained joints/fractures.																	
	3																										
	2																										
	3																										
	3	R16	86-91			5.0/4.8	95	82		R16: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to wide, sub-horizontal, iron-oxide stained joints/fractures.																	
	3																										
	3																										
	4																										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-4"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-50°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:

BORING LOG

SH. 7 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 51

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 69.64 feet NORTH: 461822.43
DATUM: NGVD 1929 EAST: 604275.34
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS			
SAMPLER: Split Spoon		FOREMAN: Doug Wood		DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)		ENGINEER: Daniela Bastos		Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.		DATE START: 3/23/06					
ROCK CORE: 3 7/8-inch diameter (HQ) wireline		DATE END: 3/28/06					

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	NUMBER	
185																													
190																													
195																													
200																													
205																													

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/TIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1"-3"	MOD. CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3"-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:

4. Waterloo multilevel sampling system installed within borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.

BORING NO. MW-51

BORING LOG

SH. 1 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 52

Reviewed by: M.A. Ponti, Jr. / C.Snee/ DJS

PROJECT NO: 41.0017869.10

COORDINATES:

G. SURF. EL. 16.77 feet

NORTH: 463253.94

DATUM: NGVD 1929

EAST: 604733.05

FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME L55 Track Rig

SAMPLER: N.A.

FOREMAN: Dave Carter / Doug Wood

GROUND WATER READINGS

CASING SIZE: 4-inch-dia. (HW)

ENGINEER: Anton Gallas / Daniela Bastos (QA by Chris Snee, 5/11/06)

DATE DEPTH CASING STABILIZATION TIME

CASING HAMMER: N.A.

DATE START: 3/18/06

Refer to Table 6.1 for Groundwater Data

ROCK CORE: 3 7/8 -inch-dia. (HQ) wireline

DATE END: 3/21/06

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER		
5										(No Soil Samples Taken)																			
10												1																	
15										Top of rock at 13 feet.		2																	
20	4	R-1	15-20			5/4.6	92	84		R-1: Hard, fresh to slightly weathered, medium to coarse grained, gray quartz-mica-garnet SCHIST. Moderate to sub-vertical, foliation, smooth close to moderately close, sub-vertical foliation fractures, and closely spaced incipient foliation fractures and widely spaced healed moderately dipping cross-foliation fractures, slightly weathered, joints/fractures; few chlorite/quartz, mineralized joints/fractures.																		2	
	5																											2	
	4																											0	
	4																											0	
25	4	R-2	20-25			5/4.8	96	96		Hard, fresh, medium to coarse grained, gray, quartz-mica-garnet SCHIST, with very thin, moderately dipping to subvertical foliation: with smooth close to moderately close, moderately dipping, slightly weathered, iron oxide stained joints/fractures.																	1		
	5																											0	
	5																											1	
	6																											1	
	6																											0	
	5	R-3	25-30			5/4.6	92	92		Hard, fresh, fine grained, gray, quartz-mica-garnet SCHIST, with very thin, moderately dipping foliation. 25.7' to 27.7 feet: sub-vertical, healed cross-foliation fractures, smooth, close to moderately close, sub-horizontal to moderately dipping, slightly weathered, iron-oxide stained joints/fractures. 29.0' to 30.0': Conjugate healed fractures.																			2
	5																											1	
	5																											1	
	6																											0	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2"	Very close	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-1'	Close	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1'-3'	Mod Close	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3'-10'	Wide	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10'	Very Wide	85°-90°	VERTICAL

NOTES:
 1. Performed 18-inch-diameter vacuum excavation from 0 to 12 feet. Allowed sufficient space to install a 2" overburden well to 12 feet.
 2. Spun and washed 4-inch-diameter (HW) casing from 12 to 15 feet. Bedrock encountered at 13 feet. HW casing set into bedrock and sealed with grout at 15 feet.

BORING NO. MW-52

BORING LOG

SH. 5 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 52

Reviewed by: M.A. Ponti, Jr. / C.Snee/DJS
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. - 16.77 feet NORTH: 463253.94
DATUM: NGVD 1929 EAST: 604733.05
FINAL BORING DEPTH: 200 feet

SAMPLER: N.A. BORING CO.: Aquifer Drilling and Testing
CASING SIZE: 4-inch-dia. (HW) FOREMAN: Dave Carter / Doug Wood
CASING HAMMER: N.A. ENGINEER: Anton Gallas / Daniela Bestos (QA by Chris Snee, 5/11/06)
ROCK CORE: 3 7/8 -inch-dia. (HQ) wireline DATE START: 3/18/06 DATE END: 3/21/06

GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH (FT), BLOWS / 6 INCH, N VALUE, ROCK PEN. / REC. (FT / FT), TOTAL CORE REC (%), ROD (%), Drilling Fluid Loss (Gallons), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Summary tables for GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), and JOINT/FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

BORING LOG

SH. 1 OF 5



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 53

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 70.26 feet NORTH: 462822.15
 DATUM: NGVD 1929 EAST: 604732.60
 FINAL BORING DEPTH: 125 feet

SAMPLER: CME 55 LC track rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Ed Bomer	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 5-inch diameter (PW)	ENGINEERS: Daniela Bastos/Maurice Ponti/Sara Covelli	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 8/20/06		
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 8/29/06		

DEPTH (FT)	CASING(BPF)/ CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN./REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	RQD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
1																											
2																											
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											
11		S1	10-10	50-0		0/0	0							1													
12																											
13																											
14		S2	13-15	5-6		24/4								2													
15				4-4																							
16																											
17																											
18																											
19																											
20																											
21		S3	20-22	6-5		24/20																					
22				8-9																							
23																											
24																											
25																											
26		S4	25-27	11-8		24/11																					
27				10-10																							
28																											
29																											
30		S5	30	50-0		0.0/0.0																					

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT FRACTURE CHARACTERISTICS		
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 2-10	1"-3" MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 10-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD						

NOTES:
 1. Performed 8-inch diameter vacuum excavation from 0 to 10 feet.
 2. Spun and washed 5-inch diameter (PW) casing to sampling depths from 10 to 30 feet. Bedrock encountered at 30 feet. Set PW casing into bedrock at 34 feet and sealed with grout.

BORING NO. MW-53

BORING LOG

SH. 1 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 54

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.99 feet NORTH: 462935.57
DATUM: NGVD 1929 EAST: 804554.25
FINAL BORING DEPTH: 206 feet

DRILLING RIG MODEL: Davey Drill DK 515 electric track rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER HAMMER: N. A.	FOREMAN: Dave Carter	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Maurice Ponti/Angela Hough	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N. A.	DATE START: 7/31/06				
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 8/25/06				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN/IN) ROCK PEN./REC. (F/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER			
5		R1	3.5-5.5			2/2	100	-		Very hard, concrete			1																	
14		R2	5.5-8.0			2.5/2.5	100	-		Very hard, concrete																				
10		R3	8.0-10.1			2.1/2.1	100	-		Very hard, concrete																				
13		R4	10.1-13.0			2.9/2.9	100	-		Very hard, concrete																				
15		R5	13-14			1/1	100	-		Very hard, concrete			2																	
15		R6	14.0-15.7			1.7/1.7	100	-		Very hard, concrete																				
12		R7	15.7-18.7			3/3	100	95		15.7'-16.8': Very hard, concrete																				
										Top of Bedrock at 16.8 feet		3																		
20										16.8'-18.7': Hard, fresh, fine grained, white MARBLE, with no apparent foliation; slightly rough to smooth, very close to moderately close, sub-vertical to moderately dipping, slightly weathered, iron-oxide stained joints/fractures; 17.5'-17.9': Calcite-silicified mineralized heated cavity, trace disseminated pyrite.		4																		
15		R8	21.0-28.3			5.3/5.3	100	72	0	R8: Hard fresh, fine grained, white MARBLE with no apparent foliation; slightly to moderately rough, very close to moderately close, moderately dipping to vertical, slightly weathered, iron-oxide stained joints/fractures. Occasional very thin, discontinuous calc-silicate mineralized heated cavities/vugs; slightly pitted texture along partially healed, sub-vertical, white calcite mineralized, slightly iron-oxide stained joints/fractures;	FZ																			
25									3	21.0'-21.6': Fracture zone: slightly to moderately rough, very close, sub-vertical to vertical, slightly weathered, iron-oxide stained joints/fractures.																				
16									0																					
14		R9	26.3-31.0			4.7/4.7	100	100	0	R9: Hard, fresh to slightly weathered, fine grained, gray MARBLE, with no apparent foliation; no apparent joints/fractures; one healed slickenside joint with black mineralized surface (exposed by hammer break); texture indicates, healed, calcite mineralized micro-breccia; slightly pitted texture between 29' and 31'.																				
30									3																					
									5																					

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-6	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL	

NOTES:
 1. Cored through concrete with coring machine to 3.5 feet below top of floor slab. Advanced boring from 3.5 to 18.7 feet using an HQ core barrel. Rollerbit between 18.7 and 21 feet.
 2. Core run R4 bottom remained in borehole; recovered R4 as part of run R5.
 3. Top of bedrock at 16.8 feet.
 4. Advanced 4-inch diameter (HW) casing to 21 feet, interface sealed with grout.

BORING NO. MW-54

BORING LOG

SH. 3 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 54

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: COORDINATES:
G. SURF. EL. 14.99 feet NORTH: 462935.57
DATUM: NGVD 1929 EAST: 604554.25
FINAL BORING DEPTH: 206 feet

DRILLING RIG MODEL: Davey Drill DK 515 electric track rig BORING CO.: Aquifer Drilling and Testing GROUND WATER READINGS

SAMPLER HAMMER: N.A. FOREMAN: Dave Carter DATE DEPTH CASING STABILIZATION TIME

CASING SIZE: 4-inch diameter (HW) ENGINEER: Maurice Ponti/Angela Hough Refer to Table 6.1 for Groundwater Data

CASING HAMMER: N.A. DATE START: 7/31/06

ROCK CORE: 3 7/8-inch diameter (HQ) wireline DATE END: 8/25/06

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
12																												
11		R16	61-66			5.0/5.0	100	100		R16: Hard, fresh, fine grained, gray-light gray MARBLE, with no apparent foliation; slightly rough, moderately close, sub-horizontal, iron-oxide stained joints/fractures, healed micro-breccia; slightly pitted texture along healed calcified, joints/fractures.																		0
11																												0
65																												1
13																												0
15																												0
12		R17	66-71			5.0/5.0	100	100		R17: Hard, fresh, fine grained, gray MARBLE, with no apparent foliation; slightly rough, moderately close to wide, sub-horizontal to moderately dipping iron-oxide stained joint/fractures; healed fault breccia.																		3
12																												0
13																												0
70																												1
14																												0
14																												0
12		R18	71-76			5.0/5.0	100	100		R18: Hard, fresh, fine grained, gray, MARBLE, with no apparent foliation; slightly rough, moderately wide, moderately dipping, iron-oxide stained joints/fractures; healed breccia; slightly pitted texture, 1/8"-1/4" calcified vugs.																		1
14																												0
75																												0
14																												0
15																												0
13		R19	76-81			5.0/5.0	100	100		R19: Hard, fresh, fine grained gray MARBLE, with no apparent foliation; smooth, moderately close to wide, moderately dipping, slightly weathered, joints/fractures; slightly pitted texture along calcified healed, joints/fractures; healed micro-breccia.																		0
14																												1
80																												1
13																												0
14																												0
13		R20	81-86			5.0/5.0	100	100		R20: Hard, fresh, fine grained, gray MARBLE, with no apparent foliation; no apparent joints/fractures; healed micro-breccia; slightly to deeply vugular texture, with calcite crystal filled vugs.																		0
15																												0
85																												0
12																												0
13																												0
10		R21	86-91			5.0/5.0	100	100		R21: Hard, fresh, fine grained, gray MARBLE, with no apparent foliation; no apparent joints/fractures.																		0
11																												0
13																												0
90																												0


GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING			SPACING/THICKNES				ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-4"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:

BORING NO. MW-54

BORING LOG

SH. 7 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

DRILLING RIG MODEL: Davey Drill DK 515 electric track rig
SAMPLER HAMMER: N. A.
CASING SIZE: 4-inch diameter (HW)
CASING HAMMER: N.A.
ROCK CORE: 3 7/8-inch diameter (HC) wireline

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: COORDINATES:
 G. SURF. EL. 14.99 feet NORTH: 462935.57
 DATUM: NGVD 1929 EAST: 604554.25
 FINAL BORING DEPTH: 206 feet

BORING CO.: Aquifer Drilling and Testing
 FOREMAN: Dave Carter
 ENGINEER: Maurice Ponti/Angela Hough
 DATE START: 7/31/06
 DATE END: 8/25/06

GROUND WATER READINGS			
DATE	DEPTH	CASING	STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4		
11									5																			1
10	R41			181-186		5.0/4.6	92	83	5	R41: Hard, slightly weathered, fine grained, gray MARBLE, with no apparent foliation; slightly rough to smooth, close to moderately close, sub-horizontal to moderately dipping, iron oxide stained joints/fractures.																	4	
10									5																			1
10									5																			1
185									5																			1
9									5																			1
9	R42			186-191		5.0/4.5	.0	90	89	6	R42: Hard, slightly weathered, fine grained, gray MARBLE, with no apparent foliation; slightly rough to smooth, close, sub-horizontal to moderately dipping, slight iron oxide stained joints/fractures.																0	
10									6																			1
10									6																			1
190									6																			1
9									6																			1
7	R43			191-196		5.0/1.3	26	0	6	R43: Hard to soft, fresh to severely weathered, fine grained, gray MARBLE, fault breccia, with no apparent foliation; rough to smooth, very close, horizontal to vertical, moderately to severely weathered silt/clay filled joints/fractures.	FZ																12	
8									6																			4
15									6																			NA
195									6																			NA
10									6																			NA
7									6																			NA
10	R44			196-201		5.0/3.6	72	31	5	R44: Hard, moderately weathered, fine grained, light gray to gray MARBLE, with no apparent foliation; slightly rough to smooth, very close to close, horizontal to vertical, iron oxide stained, silt/clay filled joints/fractures; 197.1'-201.0': Fracture zone:																		5
12									5																			11
12									5																			5
200									6																			8
14									6																			NA
11	R45			201-206		5.0/5.0	100	60	6	R45: Moderately hard to hard, slightly to moderately weathered, fine grained, light gray to gray MARBLE, with no apparent foliation; slightly rough to smooth, close to moderately close, horizontal to vertical, iron-oxide stained, clay filled joints/fractures; fault breccia; 202.0'-202.7': CLAY GOUGE soft tan, sub-vertical clay filled joints/fractures form fine gravel size texture.																		11
11									6																			2
12									5																			5
12									5																			0
									5																			0
									5																			0
									5																			0
									5																			0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS		ANGLE	ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	(3)	3-10	1"-3"	MOD CLOSE/MOD THICK	35°-55°	MID DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	(4)	11-20	3"-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	(5)		>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD								

NOTES:
 10. Waterloo multilevel sampling system installed within borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.

BORING NO. **MW-54**

BORING LOG

SH. 1 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 55

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017889.10 COORDINATES:
G. SURF. EL. 18.25 feet NORTH: 462996.42
DATUM: NGVD 1929 EAST: 604635.96
FINAL BORING DEPTH: 77.5 feet

DRILLING RIG MODEL: CME 155- Track Rig	BORING CO.: Aquter Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Ed Bomer	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Galas/Maurice Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 8/9/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HO) wireline	DATE END: 8/14/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN/IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
												1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
5										(No soil samples taken)		1															
10										Top of Bedrock at 9.5 feet		2															
15		R1	13.5-17.5			4.0/3.3	83	27	4	R1: Hard, fresh to moderately weathered, fine grained, gray MARBLE, with faint, very thin, moderately dipping foliation; rough to smooth, very close to close, sub-horizontal to vertical, severely weathered, silt/fine sand filled, iron-oxide stained joints/fractures; fault breccia.		3															
15											FZ																
15											FZ																
15		R2	17.5-22.5			5.0/5.0	100	76	4	R2: Hard, fresh to moderately weathered, fine grained, gray MARBLE, with faint, very thin, moderately dipping foliation; very close to moderately close, rough to smooth, sub-horizontal to sub-vertical, slightly weathered silt/fine sand filled, iron-oxide stained joints/fractures; 21.8'-22.5'; 23.2'-23.4': Fracture zone, rough, very close, sub-horizontal to sub-vertical, silt/fine sand, coated, iron-oxide stained joints/fractures; healed fault breccia.		3															
20											FZ																
20											FZ																
20		R3	22.5-27.5			5.0/5.0	100	76	4	R3: Hard, fresh to slightly weathered, fine grained, gray MARBLE, with faint, very thin, moderately dipping foliation; rough to smooth, very close to close, sub-horizontal to vertical, fine sand/silt coated iron-oxide stained joints/fractures, partially healed fault breccia.		3															
25											FZ																
25											FZ																
25		R4				5.0/5.0	100		-	R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, moderately dipping foliation; slightly rough to smooth, close, sub-horizontal to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.		3															
30																											


GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS	
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" Very close
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1" Close
10-30	MEDIUM DENSE	4-6	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" Mod Close
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" Wide
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" Very Wide
		>30	HARD				
							ANGLE
							ATTITUDE
							0°-5° HORIZONTAL
							5°-35° SUB-HORIZONTAL
							35°-50° MOD DIPPING
							55°-65° SUB-VERTICAL
							65°-90° VERTICAL

NOTES:
 1. Borehole hand excavated to 5 feet.
 2. Spun and washed 4-inch diameter casing from 0 to 11.5 feet. Bedrock encountered at 9.5 feet.
 3. Drilled ahead of the casing to 13.5 feet using 3 5/8-inch diameter roller bit. Interface sealed with grout to stabilize the casing.

BORING NO. MW-55

BORING LOG

SH. 2 OF 3



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 55

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO.: 41.0017869.10 COORDINATES:
G. SURF. EL.: 18.25 feet NORTH: 462998.42
DATUM: NGVD 1929 EAST: 604635.96
FINAL BORING DEPTH: 77.5 feet

DRILLING RIG MODEL: CME L55 Track Rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS							
SAMPLER HAMMER: N.A.		FOREMAN: Ed Bomer		DATE	DEPTH	CASING	STABILIZATION TIME				
CASING SIZE: 4-inch diameter (HW)		ENGINEER: Anton Gallas/Maurice Ponti		Refer to Table 6.1 for Groundwater Data							
CASING HAMMER: N.A.		DATE START: 8/9/06									
ROCK CORE: 3 7/8-inch diameter (HG) wireline		DATE END: 8/14/06									

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
												1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER				
	2									30.5'-35.0': White, healed, micro-brecciated Marble zone.		4																		2
	3																													2
	2	R5	32.5-37.5			5.0/5.0	100	100		R5: Hard, fresh, fine grained, white to gray, MARBLE, with no apparent foliation; rough to smooth, close to moderately close, sub-horizontal to moderately dipping, slightly weathered, iron-oxide stained joints/fractures.																			2	
	2																													0
35	2																													0
	2																													3
	2																													0
	2	R6	37.5-42.5			5.0/5.0	100	100		R6: Hard, fresh, fine grained, gray, MARBLE, with very thin, faint, moderately dipping foliation; no apparent joints/fractures.																				0
	2																													0
40	2																													0
	2																													0
	2																													0
	2	R7	42.5-47.5			5.0/5.0	100	85		R7: Hard, fresh, fine grained, gray, MARBLE, with no apparent foliation; rough to smooth, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures; 46.5' Dark gray, micro mylonitized, clastic artifact. 47.3'-47.5': Fracture zone, very close horizontal to vertical, iron oxide stained;																				0
	2																													0
45	2																													1
	1																													2
	2	R8	47.5-52.5			5.0/5.0	100	40		R8: Hard, fresh to slightly weathered, fine grained, gray, MARBLE, with no apparent foliation; rough to smooth, very close to moderately close, moderately dipping to vertical, iron-oxide stained joints/fractures; healed fault breccia; 49.5'-56.5': Fracture zone, very close, horizontal to vertical fine sand/silt coated, iron-oxide stained joints/fractures.	FZ																			1
	2																													1
50	2																													0
	2																													3
	2																													10
	2	R9	52.5-57.5			5.0/5.0	100	30		R9: Hard, fresh to moderately weathered, fine grained, gray, MARBLE, with no apparent foliation; rough to smooth, very close to close, moderately dipping to vertical, silt coated, iron-oxide stained joints/fractures; healed fault breccia.	FZ																		7	
	3																													5
55	2																													6
	3																													8
	2																													12
	3	R10	57.5-62.5			5.0/5.0	100	53		R10: Hard, fresh, fine grained, gray, MARBLE, with no apparent foliation; slightly rough to smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained, joints/fractures, healed fault breccia.																				5
	4																													2
60	3																													2

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNES			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2"	Very close	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-1'	Close	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1'-3"	Mod Close	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3'-10"	Wide	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10"	Very Wide	85°-90°	VERTICAL	
		>30	HARD									

NOTES:
4. Coring in fourth gear between 30' and 52.5'; third gear from 52.5'

BORING NO. MW-55

BORING LOG

SH. 3 OF 3



**Indian Point Energy Center
Energy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 55

Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO: 41.0017869.10	COORDINATES:
G. SURF. EL: 18.25 feet	NORTH: 462986.42
DATUM: NGVD 1929	EAST: 604635.96
FINAL BORING DEPTH: 77.5 feet	

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Ed Bomer	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Galles/Maurice Ponti	CASING	
CASING HAMMER: N.A.	DATE START: 8/9/06	STABILIZATION TIME	
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 8/14/06	Refer to Table 6.1 for Groundwater Data	

DEPTH (FT)	CORING (MINIFT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER			
65	4									R11: Hard, fresh, fine grained, gray, MARBLE, with no apparent foliation; slightly rough to smooth, very close to moderately close, moderately dipping to sub-vertical; iron-oxide stained joints/fractures; healed fault breccia.																	2			
	3																												0	
	4	R11	62.5-67.5			5.0/5.0	100	56																					0	
	4																												4	
	3																												1	
	4																												10	
	3																												5	
	3	R12	67.5-72.5			5.0/5.0	100	82			R12: hard, fresh, fine grained, gray MARBLE, with no apparent foliation; slightly rough to smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures; healed fault breccia.																		4	
	3																													0
70	4																													2
	3																												1	
	3																												2	
	2	R13	72.5-77.5			5.0/5.0	100	72		R13: Hard, fresh, fine grained gray MARBLE, with no apparent foliation; slightly rough to smooth, close, moderately dipping to sub-vertical, iron-oxide stained, joints/fractures; healed fault breccia.																			1	
	2																													1
75	2																													1
	3																													3
	2																													1
	2																												1	
80										End of Boring at 77.5 feet			5																	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		SPACING/THICKNESS		ANGLE	ATTITUDE		
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	NO. PER FT		<2"	Very close	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(1) 0		2"-1'	Close	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(2) 1-2		1'-3'	Mod Close	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(3) 3-10		3'-10'	Wide	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH	(4) 11-20		>10'	Very Wide	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 5. Monitoring wells installed within borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.
 2. Spun and washed 4-inch diameter casing from 0 to 11.5 feet. Bedrock encountered at 9.5 feet. Interface sealed with grout to stabilize the casing.
 3. Drilled ahead of the casing to 13.5 feet using 3 5/8-inch diameter roller bit.

BORING NO. MW-55

BORING LOG

SH. 2 OF 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 56

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 70.26 feet NORTH: 462708.49
DATUM: NGVD 1929 EAST: 604658.09
FINAL BORING DEPTH: 88.5 feet

DRILLING RIG MODEL: CME L55 Track Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER: 3-inch split spoon	FOREMAN: Ed Bomer	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW)	ENGINEER: S. Covelli/A. Galois	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 8/23/05				
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 8/29/05				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5		
31												5, 6																	
32																													
33																													
34																													
35	3	R1	34-39			5.0/5.0	100	65	4	R1: Hard, fresh, fine grained, gray MARBLE, with no apparent foliation, slightly rough to smooth, very close to moderately close, sub-vertical to vertical, slightly weathered, calc-silicate mineralized joints/fractures; 38.0'-39.0': Healed, pitted, breccia, with moderately healed, rough to smooth, calcite mineralized joints/fractures; 37.5-43.0': Fracture zone, smooth to rough, very close to close, sub-vertical to moderately dipping, slightly weathered joints/fractures.		7																	1
36	3								4																			2	
37	2								3																			2	
38	3								4				FZ															2	
39	4								3				FZ															11	
40	4	R2	39-44			5.0/5.0	100	25	10	R2: Hard, fresh, fine grained, gray MARBLE with no apparent foliation; slightly rough, very close, moderately dipping to sub-vertical, slightly weathered, pitted, calcite mineralized joints/fractures.		8																5	
41	3								10				FZ															4	
42	3								20				FZ															5	
43	4								15																			4	
44	4								20																			3	
45	3	R3	44-49			5.0/5.0	100	100	6	R3: Hard, fresh, fine grained gray MARBLE with no apparent foliation, no apparent joints/fractures.																		0	
46	2								6																			0	
47	3								5																			0	
48	2								6																			0	
49	2								6																			0	
50	3	R4	49-54			5.0/5.0	100	83	10	R4: Hard, fresh, fine grained gray MARBLE with no apparent foliation; slightly rough, close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained, healed joints/fractures.																		1	
51	3								8																			0	
52	2								6																			3	
53	3								10																			1	
54	2								6																			0	
55	2	R5	54-59			5.0/5.0	100	97	5	R5: Hard, fresh, fine grained, gray MARBLE with no apparent foliation; very close to moderately close, calcite/manganese, iron-oxide stained joints/fractures; disseminated pyrite within matrix.																		0	
56	2								4																			1	
57	3								6																			3	
58	2								6																			0	
59	2								5																			0	
60	4	R6	59-64			5.0/5.0	100	97	6																			0	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS							
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT			SPACING/THICKNES			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL			
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-3"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL			
10-30	MEDIUM DENSE	4-6	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD. CLOSE/MOD THICK	35°-55°	MOD. DIPPING			
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-65°	SUB-VERTICAL			
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	65°-90°	VERTICAL			

NOTES:
 5. HW casing and advanced to 31 feet and set in ground.
 6. Roller bit used to advance borehole between 31.0 and 35.0 feet; truncated joints/fractures at 35.3 feet and 40.7 feet below ground surface.
 7. HQ coring started at 34.0 feet; borehole advanced using a 3 7/8-inch diameter (HQ) rock core barrel between 34 and 88.5 feet.
 8. Fracture zone between 37.5 and 43.0 feet.

BORING NO. MW-56

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 58

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
COORDINATES:
G. SURF. EL. 14.57 feet NORTH: 462864.26
DATUM: NGVD 1929 EAST: 604400.31
FINAL BORING DEPTH: 72.5 feet

Table with 4 columns: DRILL RIG MODEL, SAMPLER HAMMER, CASING SIZE, CASING HAMMER, ROCK CORE, BORING CO., FOREMAN, ENGINEERS, DATE START, DATE END, GROUND WATER READINGS (DATE, DEPTH, CASING, STABILIZATION TIME), and a reference to Table 6.1.

Main data table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 6 INCH, N VALUE, SOIL PEN. / REC. (IN / IN), ROCK PEN./REC. (PT/FT), TOTAL CORE REC (%), RQD (%), DRILLING FLUID LOSS (GALLONS), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), and NO. OF FRACTURES PER FOOT.

Summary tables for GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS, and JOINT/FRACTURE CHARACTERISTICS.

NOTES:
BORING NO. MW-58

BORING LOG



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 58

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.57 feet NORTH: 462864.26
DATUM: NGVD 1929 EAST: 604400.31
FINAL BORING DEPTH: 72.5 feet

DRILL RIG MODEL: CME L55 Track Rig
SAMPLER HAMMER: 140 lbs.
CASING SIZE: 4-inch diameter (HW)
CASING HAMMER: N.A.
ROCK CORE: 3 7/8-inch diameter (HQ) wireline

BORING CO.: Aquifer Drilling and Testing
FOREMAN: Dave Carter
ENGINEERS: Anton Gallas/Daniela Bastos/Maurice Ponti/Sara Covelli
DATE START: 6/29/06
DATE END: 7/10/06


GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

Main data table with columns for Depth (FT), Coring (Min/ft), Sample / Core No., Sample Depth, Blows / 6 Inch, N Value, Soil Pen. / Rec. (in/in) / Rock Pen./Rec. (ft/ft), Total Core Rec (%), Rod (%), Drilling Fluid Loss (Gallons), Sample Description, Fractured Zone Observed, Notes, In Situ Properties (Hardness, Weathering), and No. of Fractures per Foot.

End of Boring 72.5 feet.

Summary table with columns: GRANULAR SOILS (BPF, DENSITY), COHESIVE SOILS (BPF, CONSISTENCY), ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), JOINT/FRACTURE CHARACTERISTICS (NO. PER FT, SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
7. Monitoring wells installed within borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.


BORING LOG													SH. 1 OF 3													
					Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY					BORING NO. MW - 59																
										Reviewed by: M.A. Ponti, Jr. - D. Schipper																
										PROJECT NO: 41.0017869.10			COORDINATES:													
										G. SURF. EL. 14.52 feet			NORTH: 462912.91													
DATE: 9/5/06						EAST: 604330.15																				
DATE START: 9/5/06						FINAL BORING DEPTH: 77 feet																				
DATE END: 9/8/06						GROUND WATER READINGS																				
SAMPLER: 3" split spoon						DATE		DEPTH		CASING		STABILIZATION TIME														
SAMPLER HAMMER: 140 lbs Automatic						Refer to Table 6.1 for Groundwater Data																				
CASING SIZE: 4-inch diameter (HW)																										
CASING HAMMER: N.A.																										
ROCK CORE: 3 7/8-inch diameter (HQ) wireline																										
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
													HARDNESS					WEATHERING					see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
1										(No soil samples taken from 0 to 7 feet)																
2																										
3																										
4																										
5																										
6																										
7																										
8		S1	7-9	13 - 6	12	24/16				S1: Medium dense, gray, medium GRAVEL, some Sand, trace Silt.																
9				6 - 5																						
10		S2	9-11	4 - 6	14	24/19				S2: Medium dense, brown-gray, medium GRAVEL and fine to coarse SAND, trace Silt.																
11				8 - 8																						
12		S3	11.0-12.2	8 - 38	--	14/2				S3: Very dense, gray, medium GRAVEL, some fine to coarse Sand, little Silt.																
13				50/2"						Top of Bedrock at 13 feet																
14																										
15																										
16		S4	15.0-15.2	50/2"	--	2/0				S4: No recovery.																
17																										
18																										
19		S5	18-18	0"/100		0/0				S5: No penetration/No recovery.																
20																										
21																										
22																										
23																										
24																										
25	4	R1	24-27			3.0/2.6	85	0	10	R1: Hard, slightly weathered to fresh, fine grained, gray MARBLE with no apparent foliation; rough to smooth, very close to close, moderately dipping to sub-vertical, slightly weathered, iron-oxide stained joints/fractures; 24.0-45.0: Fracture zone, rough to smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures.	FZ										12					
26	6										FZ										12					
27	8'										FZ										12					
28	4	R2	27-32			5.0/4.5	90	23	10	R2: Hard, fresh, fine grained, gray MARBLE with no apparent foliation, rough to smooth, very close to close, moderately dipping to sub-vertical, slightly weathered, with calcite mineralized joints/fractures.	FZ	7									7					
29	4										FZ										6					
30	5										FZ										8					

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-4"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V-STIFF	5	VERY HARD	5	FRESH			>12"	VERY WIDE/VERY THICK	85°-90°	VERTICAL	
		>30	HARD											

NOTES:

- Bore hole was vacuum excavated between 0 and 5.0 feet below existing grade (b.e.g.) Borehole advanced using CME 55 Truck Rig
- Weathered bedrock cuttings observed between 13.0 feet and 17.5 feet.
- Bore hole advanced with 3 5/8" diameter roller bit between 13.2 feet and 15.0 feet and 15.8 feet and 18.0 feet.
- Drilling fluid lost between 16.0 feet and 17.0 feet estimated to be 20 gallons.
- H.W. diameter casing advanced and set with grout at 18.0 feet (b.e.g.)
- Very soft material encountered between 18.0 feet and 24.0 feet; no rock core sampled.
- Core barrel locked inside the HQ wire-line casing at 27.0 feet. HQ casing was pulled out of the borehole, cleaned and re-installed.

BORING NO.	MW-59
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BORING LOG														SH. 1 OF 7														
					Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY				BORING NO. MW - 60 Reviewed by: M.A. Ponti, Jr. - D. Schipper					COORDINATES: PROJECT NO: 41.0017869.10 G. SURF. EL. 14.31 feet DATUM: NGVD 1929 FINAL BORING DEPTH: 200 feet														
									DATE		DEPTH		CASING		STABILIZATION TIME													
DRILLING RIG MODEL: CME SS Truck Rig					BORING CO.: Aquifer Drilling and Testing				GROUND WATER READINGS																			
SAMPLER HAMMER: N.A.					FOREMAN: Dave Carter				Refer to Table 6.1 for Groundwater Data																			
CASING SIZE: HQ					ENGINEER: Angela Hough																							
CASING HAMMER: N.A.					DATE START: 10/11/06																							
ROCK CORE: 3 7/8-inch diameter (HQ) wireline					DATE END: 10/23/06																							
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN)	ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT									
														HARDNESS					WEATHERING					see below for values				
														1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
(No soil samples taken from 0 to 6 feet)																												
S1: Very dense, medium GRAVEL, trace brown fine to medium Sand. Top of Bedrock at 8.5 feet																												
8	R1	10 - 15				5.0/5.0	100	80	6		R1: Hard, fresh, fine grained, white to gray MARBLE with faint, very thin, sub-horizontal to moderately dipping foliation; smooth to rough, very close to moderately close, horizontal to vertical, fine sand/silty clay coated, iron-oxide stained joints/fractures healed microbreccia.	FZ												2				
7									6			FZ														1		
6									6		10-13.5': Fracture zone, smooth to rough, very close to close horizontal to vertical, fine sandy/silty coated, iron-oxide stained joints/fractures.	FZ														2		
3									6			FZ														3		
15	4								6																		0	
3	R2	15-20				5.0/5.0	100	100	6		R2: Hard, fresh, fine grained, white to gray MARBLE, with faint, very thin, sub-horizontal to moderately dipping foliation: rough to smooth, moderately close to wide horizontal, iron-oxide stained joints/fractures; healed microbreccia.															1		
4									6																		0	
3									6		15.8'-16.5': White calcite, healed zone;																1	
4									6																		0	
20	4								6																		1	
3	R3	20-25				5.0/5.0	100	100	6		R3: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-horizontal to moderately dipping foliation: one rough, sub-horizontal, moderately close, slightly iron-oxide stained joint/fracture; healed breccia.																0	
4									7																		1	
3									6																			0
4									7																			0
25	4								7																			0
4	R4	25-30				5.0/5.0	100	100	6		R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-horizontal to sub-vertical, no apparent foliation: one smooth, wide, sub-vertical iron-oxide stained joint/fracture; healed breccia.																0	
3									6																			0
3									6																			1
5									6																			0
30	4								6																			0
GRANULAR SOILS			COHESIVE SOILS			ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS																	
BPF DENSITY			BPF CONSISTENCY			HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNES		ANGLE ATTITUDE													
0-4 VERY LOOSE			<2 VERY SOFT			1 VERY SOFT		1 COMPLETE			(1) 0		<2" VERY CLOSE/VERY THIN		0°-5° HORIZONTAL													
4-10 LOOSE			2-4 SOFT			2 MEDIUM		2 SEVERE			(2) 1-2		2-4" CLOSE/THIN		5°-35° SUB-HORIZONTAL													
10-30 MEDIUM DENSE			4-8 M. STIFF			3 MODERATELY HARD		3 MODERATE			(3) 3-10		1-3" MOD. CLOSE/MOD. THICK		35°-55° MOD. DIPPING													
30-50 DENSE			8-15 STIFF			4 HARD		4 SLIGHT			(4) 11-20		3-10" WIDE/THICK		55°-85° SUB-VERTICAL													
>50 VERY DENSE			15-30 V. STIFF			5 VERY HARD		5 FRESH					>10" VERY WIDE/VERY THICK		85°-90° VERTICAL													

NOTES:
1. Performed 8-inch diameter vacuum excavation from 0 to 6 feet.
2. Spun and washed 4-inch diameter (HW) casing from 6 to 8 feet and took S-1. Casing set into bedrock with grout at about 8.5 feet.

BORING NO. MW-60

BORING LOG

SH. 5 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 60

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 14.31 feet NORTH: 463381.28
 DATUM: NGVD 1929 EAST: 604585.60
 FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: N.A.	FOREMAN: Dave Carter	DATE	DEPTH
CASING SIZE: HO	ENGINEER: Angela Hough	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 10/11/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 10/23/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN./IN) ROCK PEN. / REC. (F./FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT		
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
3		R23	120-125			5.0/5.0	100	92	10	R23: Hard, fresh, fine grained, white MARBLE with faint, very thin, subhorizontal foliation: smooth, wide, moderately dipping to sub-vertical, moderately healed, pitted joints/fractures with white calcite minerals.																		0		
3									8																				0	
3									10																				2	
5									10																				1	
5									12																				0	
4		R24	125-130			5.0/5.0	100	100	10	R24: Hard, fresh, fine grained, gray MARBLE with faint, very thin, moderate to subhorizontal foliation: rough, close, moderately dipping, slightly weathered joints/fractures.																		0		
3									10																				0	
3									10																				0	
4									12																				1	
3									8																			0		
3		R25	130-135			5.0/4.9	100	100	8	R25: Hard, fresh, fine grained, white MARBLE with faint, very thin foliation: smooth, close to wide, moderately dipping, pitted, slightly weathered joints/fractures.																			0	
3									8																				0	
3									8																				0	
3									8																				0	
3									8																				1	
4		R26	135-140			5.0/5.0	100	86	8	R26: Hard, fresh, fine grained, white MARBLE with faint, very thin foliation: rough, close to moderately close, sub-horizontal to moderately dipping, slightly weathered joints/fractures; with white calcite minerals: 136.7-138.0': Fracture zone, rough to smooth, close to moderately close, sub horizontal to moderately dipping, slightly weathered joints/fractures; slightly pitted texture																				0
4									10																					1
3									20			FZ																	5	
3									20																				1	
3									15																				0	
3		R27	140-145			5.0/5.0	100	92	10	R27: Hard, fresh, fine grained, white MARBLE with faint, very thin, subhorizontal to moderate dipping foliation: rough to smooth, close, sub-horizontal, slightly weathered joints/fractures																				0
4									15																					1
4									8																					1
4									8																					0
3									10																					0
3		R28	145-150			5.0/5.0	100	43	8	R28: Hard, fresh, fine grained, white MARBLE with faint, very thin, subhorizontal foliation: rough to smooth, close, sub-horizontal to moderately dipping, slightly weathered joints/fractures.																				1
3									10																					1
3									10																					2
3									8																					1
3									10																					0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS							
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE		ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2'	VERY CLOSE/VERY THIN	0°-5°		HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2'-11'	CLOSE/MIN	5°-35°		SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	11'-3'	MOD CLOSE/MOD THICK	35°-65°		MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10'	WIDE/THICK	65°-85°		SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°		VERTICAL

NOTES:

BORING NO. MW-60

BORING LOG														SH. 6 OF 7														
				Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY				BORING NO. MW - 60 Reviewed by: M.A. Ponti, Jr. - D. Schipper PROJECT NO: 41.0017869.10 COORDINATES: G. SURF. EL. 14.31 feet NORTH: 463381.26 DATUM: NGVD 1929 EAST: 604585.60 FINAL BORING DEPTH: 200 feet																				
DRILLING RIG MODEL: CME 55 Truck Rig SAMPLER HAMMER: N.A. CASING SIZE: HQ CASING HAMMER: N.A. ROCK CORE: 3 7/8-inch diameter (HQ) wireline				BORING CO.: Aquifer Drilling and Testing FOREMAN: Dave Carter ENGINEER: Angela Hough DATE START: 10/11/06 DATE END: 10/23/06				GROUND WATER READINGS DATE DEPTH CASING STABILIZATION TIME Refer to Table 6.1 for Groundwater Data																				
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
3	R29		150-155			5.0/5.0	100	100	8	R29: Hard, fresh, fine grained, white MARBLE with faint, very thin, sub-horizontal to moderately dipping foliation, smooth, moderately close to wide, sub-horizontal to moderately dipping, slightly weathered joints/fractures.																	0	
3									8																			0
3									10																			0
4									8																			1
3									15																			0
3	R30		155-160			5.0/5.0	100	76	20	R30: Hard, fresh, fine grained, white MARBLE with faint, very thin foliation: smooth, very close to moderately close, moderately dipping to sub-vertical, slightly to moderately weathered, joints/fractures.	FZ																8	
2									15																			6
3									10	155.4'-156.6': Fracture zone, smooth, very close to moderately close, moderately dipping to sub-vertical, slightly to moderately weathered, joints/fractures; slightly pitted.	FZ																1	
3									8																			1
3									8																			1
3	R31		160-165			5.0/5.0	100	100	8	R31: Hard, fresh, fine grained, white MARBLE with faint, very thin, moderate to sub-vertical foliation: smooth, close to wide, moderately dipping to sub-horizontal, slightly weathered joints/fractures;																	1	
3									10																			0
3									8																			0
4									8																			0
3									10																			0
4	R32		165-170			5.0/5.0	100	90	10	R32: Hard to very soft, fresh to completely weathered, fine grained, white MARBLE with faint, very thin to thin, moderately dipping to subvertical foliation: smooth to rough, close to moderately close, moderately dipping to sub-vertical, slightly weathered joints/fractures;		5															0	
6									12																			7
6									10	166.2'-166.7': Clay GOUGE very soft, gray to tan, silty clay, with sub-vertical, distinct upper contact.	FZ																1	
4									8																			1
3									8																			1
4	R33		170-175			5.0/5.0	100	78	8	R33: Hard, fresh, fine grained, white to gray MARBLE with faint, very thin to thin, moderately dipping foliation: smooth, close to moderately close, moderately dipping slightly weathered joints/fractures;																	0	
6									8																			0
6									8	173.9'-175.0': Hard to moderately hard, fresh, dark, gray talcaceous, quartz-mica-gamet SCHIST, with distinct, very thin to thin, moderately dipping foliations: smooth, very close, moderately dipping, slightly weathered joints/fractures; mylonized texture.																	0	
5									10																			0
4									12																			9
5	R34		175-180			5.0/4.5	90	56	20	R34: Hard, fresh, fine grained, dark gray talcaceous quartz-mica-gamet SCHIST, with distinct, very thin, discontinuous, moderately dipping, to subvertical, occasionally convoluted foliation: smooth, very close to moderately close, moderately dipping to vertical, slightly weathered joints/fractures; mylonized texture, with white to light gray, very thin lenses of quartz rich/calcsilicate.																	12	
5									20																			4
5									20																			2
6									8																			6
10									8																			0
GRANULAR SOILS			COHESIVE SOILS			ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS																	
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE																			
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1) 0	<2' VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL																			
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2) 1-2	2'-1' CLOSE/THIN	5°-35°	SUB-HORIZONTAL																			
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	(3) 2-10	1'-3' MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING																			
30-50	DENSE	8-15	STIFF	4	HARD	(4) 10-20	3'-10' WIDE/THICK	55°-85°	SUB-VERTICAL																			
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD		>10' VERY WIDE/VERY THICK	85°-90°	VERTICAL																			
		>30	HARD																									
NOTES: 5. Drilling fluid return water changed color from light gray to dark gray at 166.5' - 187.0'.																												

BORING LOG

SH. 1 OF 8



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 61

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. NORTH:
DATUM: NGVD 1929 EAST:
FINAL BORING DEPTH: 223 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER HAMMER: 140 lbs Automatic	FOREMAN: Paul Gaddis	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 6-inch diameter (SW)	ENGINEER: A. Hough/M. Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 9/6/06				
ROCK CORE: 3 7/8-inch diameter (HQ) core barrel	DATE END:				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN/IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	NUMBER
(No soil samples taken from 0 to 7 feet)																												
5												1																
		S1	7-9	7 - 3	5	24/12			102	S1: Loose, fine to medium GRAVEL, some fine to medium brown Sand, trace Silt.		2																
10				2 - 4																								
		S2	9-11	14 - 13	27	24/6			147	S2: Medium dense, fine to medium GRAVEL, some fine to coarse brown Sand, trace Silt.																		
				14 - 15																								
		S3	11-13	9 - 8	16	24/13			302	S3: Medium dense, fine to medium GRAVEL, some gray Clay and Silt.																		
				8 - 15																								
15		S4	13-15	13 - 16	27	24/11			199	S4: Medium dense, fine to medium GRAVEL, trace fine to coarse brown Sand.																		
				11 - 8																								
		S5	15-17	11 - 12	31	24/13			230	S5: Dense, fine to medium GRAVEL, some gray fine to coarse Sand, trace Silt.																		
				19 - 11																								
		S6	17-19	10 - 12	30	24/11			479	S6: Dense, fine to medium GRAVEL, some gray fine to coarse Sand, trace Silt.																		
20				18 - 12																								
		S7	19-21	13 - 26	39	24/7			173	S7: Dense, fine to medium GRAVEL.																		
				13 - 5																								
		S8	21-23	5 - 4	9	24/4			189	S8: Stiff, gray CLAY and SILT, trace, fine to medium Gravel.																		
				4 - 5																								
25		S9	23-25	WH - 2	5	24/23			183	S9: Loose, gray SILT and CLAY, trace medium Gravel.																		
				3 - 4																								
		S10	25-27	1 - 2	4	24/24				S10: Medium Stiff, gray CLAY and SILT, trace medium Gravel.																		
				2 - 3																								
		S11	27-29	4 - 3	7	24/24				S11: Medium stiff, gray, Silty CLAY, trace medium Gravel.																		
				4 - 6																								
30		S12	29-31	2 - 3	9	24/10			26	S12: Stiff, gray, Silty CLAY.																		

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	Very close	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	Close	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	Mod Close	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	Wide	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	Very Wide	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 1. Performed 8-inch diameter vacuum excavation from 0 to 7 feet.
 2. Spun and washed 6-inch diameter (SW) casing from 7 to 37 feet.

BORING NO. MW-61

BORING LOG

SH. 3 OF 8



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 61

Reviewed by: M.A. Pontil, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
G. SURF. EL.: NORTH
DATUM: NGVD 1928 EAST
FINAL BORING DEPTH: 223 feet

DRILLING RIG MODEL: CME 55 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER HAMMER: 140 lbs Automatic	FOREMAN: Paul Gaddis	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 6-inch diameter (5W)	ENGINEER: A. Hough/M. Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 9/8/06				
ROCK CORE: 3 7/8-inch diameter (HQ) core barrel	DATE END:				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
15									8					1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
9		R4	61-66			5.0/5.0	100	66	2	R4: Hard, fresh, fine grained, gray MARBLE, no apparent foliation; smooth to rough, sub-horizontal to sub-vertical, very close to close, iron-oxide stained joints/fractures.	FZ																	12
10									2																			7
9									2																			1
65									2																			2
10									2																			2
8		R5	66-71			5.0/5.0	100	60	2	R5: Hard, fresh, fine grained, gray MARBLE, no apparent foliation; smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.																		2
7									2										FZ									9
70									2	67'-69': Fracture Zone: Smooth to rough, very close to close, subvertical, iron-oxide stained, joints/fractures.	FZ								FZ									10
9									2																			1
10									2																			3
6		R6	71-76			5.0/5.0	100	46	2	R6: Hard, fresh, fine grained, gray MARBLE, no apparent foliation; smooth to rough, very close to close, sub-horizontal to vertical, iron-oxide stained joints/fractures.									FZ									2
6									2	72.0'-75.6': Fractured zone: smooth to rough, very close to close, sub-horizontal to vertical, iron-oxide stained, joints/fractures.	FZ								FZ									10
5									2										FZ									1
75									2																			12
5									2																			3
5		R7	76-81			5.0/5.0	100	72	2	R7: Hard, fresh, fine grained, gray MARBLE, with faint very thin, sub-vertical foliation: rough to smooth, very close to moderately close, horizontal to vertical, iron-oxide stained joints/fractures. 79.3'-83.0': Fracture zone: Smooth to rough, very close to close, horizontal to vertical, iron-oxide stained joints/fractures.																		0
6									2																			0
5									2																			0
80									2										FZ									4
7									2																			
7									2										FZ									8
5		R8	81-86			5.0/5.0	100	94	2	R8: Hard fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation; smooth to rough, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures. 86.0'-88.5': Fracture zone: rough to smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ								FZ									3
6									3										FZ									2
5									3																			0
6									3																			1
5									2										FZ									0
4		R9	86-91			5.0/5.0	100	64	3	R9: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation; smooth, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ								FZ									3
5									3										FZ									5
5									3																			3
90									3																			0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO PER FT	SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	Very close	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1"	Close	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3"	Mod Close	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10"	Wide	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10"	Very Wide	85°-90°	VERTICAL	

NOTES:

BORING NO. MW-61

BORING LOG				SH. 5 OF 8
		Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY	BORING NO. MW - 61	
		Reviewed by: M.A. Ponti, Jr. - D. Schipper		
		PROJECT NO: 41,0017869.10	COORDINATES:	
		G. SURF. EL.	NORTH:	
		DATUM: NGVD 1929	EAST:	
		FINAL BORING DEPTH: 223 feet		

DRILLING RIG MODEL: CME 55 Truck Rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS					
SAMPLER HAMMER: 140 lbs Automatic		FOREMAN: Paul Gaddis		DATE	DEPTH	CASING		STABILIZATION TIME	
CASING SIZE: 6-inch diameter (SW)		ENGINEER: A. Hough/M. Ponti		Refer to Table 6.1 for Groundwater Data					
CASING HAMMER: N.A.		DATE START: 9/6/06							
ROCK CORE: 3 7/8-inch diameter (HQ) core barrel		DATE END:							

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN)	ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES										NO. OF FRACTURES PER FOOT					
														HARDNESS					WEATHERING					see below for values					
														see below for values					see below for values					see below for values					
125		R16	121-128			5.0/5.0		100	88		R16: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation; smooth, close, moderately dipping to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.																		0
																													0
																													2
																													1
																													0
130		R17	126-131			5.0/5.0		100	100		R17: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation; no apparent joints/fractures.																		0
																													0
																													0
																													0
																													0
135		R18	131-136			5.0/5.0		100	100		R18: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation; no apparent joints/fractures.																		0
																													0
																													0
																													0
																													0
																													0
																													0
140		R19	136-141			5.0/0.2		4	0	3	R19: Hard, fresh, fine grained, gray MARBLE with faint very thin, sub-vertical foliation:																		1
											136'-223': Fracture zone: Fault breccia, with clay gouge																		NA
																													NA
																													NA
																													NA
																													NA
																													NA
145		R20	141-146			5.0/0.8		5	17	0	R20: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, sub-vertical foliation; rough, close, sub-horizontal, iron-oxide stained joints/fractures.																		1
																													NA
																													NA
																													NA
																													NA
150		R21	146-151			5.0/0		0	NA	3	R21: No Recovery																		NA
																													NA
																													NA
																													NA
																													NA

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	Very close	0°-30°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	Close	35°-55°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	Mod Close	55°-85°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	Wide		SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	Very Wide	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 5. Return water was thick, white and foamy.

BORING LOG

SH. 7 OF 8



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 61

Reviewed by: M.A. Pontil, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. NORTH:
DATUM: NGVD 1929 EAST:
FINAL BORING DEPTH: 223 feet

DRILLING RIG MODEL: CME 55 Truck Rig BORING CO.: Aquifer Drilling and Testing
SAMPLER HAMMER: 140 lbs Automatic FOREMAN: Paul Gaddis
CASING SIZE: 6-inch diameter (SW) ENGINEER: A. Hougham, Pontil
CASING HAMMER: N.A. DATE START: 9/8/06
ROCK CORE: 3 7/8-inch diameter (HQ) core barrel DATE END:

GROUND WATER READINGS

DATE	DEPTH	CASING	STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC. (%)	RCD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT	
													HARDNESS		WEATHERING				NO. OF FRACTURES PER FOOT
													1	2	3	4	5		
11			181.5-						3	R28: No Recovery									
8	R28		186.5			5.0/0	0	NA	2										
8									2										
185.5									2										
11			186.5-						2	R29: No Recovery									
9	R29		191.5			5.0/0	0	NA	4										
6									3										
190.5									3										
7									3	R30: No Recovery									
6			181.5-			5.0/0	0	NA	4										
6			196.5						4										
195.5									4										
5									4	S18: Fractured zone: Severly to completely weathered, very close to close, horizontal to vertical, clay coated joints/fractures. Fault breccia.									
5	S18		196.5- 197.7	14 - 37 100/2"	NA	14/10		NA											
8	R31		197.7- 200.3						4		R31: No Recovery								
200									4										
6									6	S19: Fractured zone: Severly to completely weathered, very close to close, horizontal to vertical, clay coated joints/fractures. Fault breccia. R32: Fracture zone: hard, fresh, fine grained, gray MARBLE with no apparent foliation; rough to smooth, very close to close, vertical to horizontal joints/fractures.									
6			200.3- 201.0	39 100/2"	NA	8/3		NA											
6	R32		201-206			5.0/1.5	30	0	6										
205									6										
6									6	R33: No recovery.									
6			206 - 211			5.0/0	0	0	5										
210									5										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNES			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2"	Very close	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1'	Close	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3'	Mod Close	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10'	Wide	55°-65°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10'	Very Wide	65°-90°	VERTICAL	
		>30	HARD								

NOTES:

BORING NO. MW-61

BORING LOG

SH. 8 OF 8



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 61

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO.: 41.0017889.10
G. SURF. EL. NORTH:
DATUM: NGVD 1929 EAST:
FINAL BORING DEPTH: 223 feet

DRILLING RIG MODEL: CME SS Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: 140 lbs Automatic	FOREMAN: Paul Geddis	DATE	DEPTH
CASING SIZE: 6-inch diameter (SW)	ENGINEER: A. Hough/M. Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 9/6/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch diameter (HQ) core barrel	DATE END:		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC. (%)	RQD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
													HARDNESS					WEATHERING					see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
6																										
2		R34	211-216			5.0/0	0	NA		R34: No Recovery.																
2																										
3																										
215																										
3																										
3																										
4		R35	216-221			5.0/0	0	NA		R35: No Recovery.																
6																										
6																										
220																										
7																										
3		S20	221.0-222.8	12 - 38	124	1.75/0.42	24	NA		S20: Fractured zone: Severly to completely weathered, very close to close, horizontal to vertical, clay coated joints/fractures. Fault breccia.																
										Bottom of Boring at 223 feet																
225																										
230																										
235																										
240																										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNES	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2" Very close	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-1" Close	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1"-3" Mod Close	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3"-10" Wide	55°-65°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10" Very Wide	65°-90°	VERTICAL
		>30	HARD							

NOTES:
10. No equipment installed. Borehole backfilled with grout.

BORING NO. MW-61

PRELIMINARY BORING LOG

SH. 1 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 62

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
COORDINATES:
G. SURF. EL. 14.69 feet NORTH: 483086.79
DATUM: NGVD 1929 EAST: 604350.80
FINAL BORING DEPTH: 201 feet

DRILLING RIG MODEL: CME 550 Truck Rig

BORING CO.: Aquifer Drilling and Testing

GROUND WATER READINGS

SAMPLER HAMMER: 140 lbs Automatic

FOREMAN: Paul Gaddis

DATE DEPTH CASING STABILIZATION TIME

CASING SIZE: 6-inch diameter (SW)

ENGINEER: Maurice Ponti/Windell Barry

Refer to Table 6.1 for Groundwater Data

CASING HAMMER: 300 lbs Automatic

DATE START: 8/17/06

DATE END:

ROCK CORE: 3 7/8-inch diameter (HQ) core barrel

Main data table with columns for Depth (ft), Coring (min/ft), Sample/Core No., Sample Depth (ft), Blows/6 inch, N Value, Soil Pen./Rec. (in/ft), Rock Pen./Rec. (ft/ft), Total Core Rec (%), Rod (%), Drilling Fluids Lost (Gallons), Sample Description, Fractured Zone Observed, Notes, In Situ Properties (Hardness, Weathering), and No. of Fractures per Foot.

(No soil samples taken from 0 to 7 feet)

S1: Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt.

S2: Medium dense, brown-gray, fine to coarse SAND, little Silt, trace Gravel.

S3: Dense, brown-gray, fine to coarse SAND, little Silt, trace Gravel.

S4: Dense, brown-gray, fine to coarse SAND, trace Gravel, trace Silt.

S5: Medium dense, brown-gray, fine to coarse SAND, trace Gravel, trace Silt.

S6: Loose, brown-gray, fine to coarse GRAVEL and SAND, trace Silt.

S7: Soft, gray clayey SILT, trace fine to medium Sand, trace fine Gravel, trace organic fibers.

S8: Soft, gray Clayey SILT, trace Organic Fibers.

S9: Soft, gray, Clayey SILT, trace shell fragments, trace organic fibers.

S10: Soft, gray SILT and CLAY, trace shell fragments, trace organic fibers.

S11: Soft, gray SILT and CLAY, trace shell fragments, trace organic fibers, trace gravel.

S12: Soft, gray SILT and CLAY, trace shells.

Soil and Rock Core Characteristic Tables

GRANULAR SOILS table with columns: SPT, DENSITY, Consistency

COHESIVE SOILS table with columns: SPT, CONSISTENCY

ROCK CORE CHARACTERISTICS table with columns: HARDNESS, WEATHERING

NO PER FT and JOINT/FRACTURE CHARACTERISTICS tables

ANGLE ATTITUDE table with columns: ANGLE, ATTITUDE

NOTES:

- 1. Performed 8-inch diameter vacuum excavation from 0 to 7 feet.
2. Spun and washed 6-inch diameter (SW) casing to sampling depths from 7 to 37 feet.
3. Soil samples S1 and S2 obtained using a 2" diameter split spoon sampler; soil samples S3-S16 obtained using a 3" diameter split spoon sampler
4. Stratum change at 19.0'

BORING NO. MW-62

PRELIMINARY BORING LOG

SH. 2 OF 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 62

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017889.10 COORDINATES:
G. SURF. EL. 14.69 feet NORTH: 463086.79
DATUM: NGVD 1929 EAST: 604350.80
FINAL BORING DEPTH: 201 feet

Table with columns for sample depth, blow count, sample description, and fracture characteristics. Includes detailed data for samples S13-S16 and R1-R4, with fracture zones (FZ) identified at various depths.

NOTES:
5. Stratum change at approximately 33.0'.
6. Split spoon refusal at 38.7'.
7. Rods and spoon bouncing while sampling for sample S16. Top of bedrock encountered at approximately 37 feet.
8. Casing set into bedrock between approximately 37' and 41'.

BORING NO. MW-62

BORING LOG

SH. 3 OF 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 62


Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO: 41.0017869.10	COORDINATES:
G. SURF. EL. 14.69 feet	NORTH: 463086.79
DATUM: NGVD 1929	EAST: 604350.80
FINAL BORING DEPTH: 201 feet	

DRILLING RIG MODEL: CME 550 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: 140 lbs Automatic	FOREMAN: Paul Gaddis	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 6-inch diameter (SW)	ENGINEER: Maurice Ponti/Windell Barry	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: 300 lbs Automatic	DATE START: 8/17/06		
ROCK CORE: 3 7/8-inch diameter (HC) core barrel	DATE END:		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC (IN / IN) ROCK PEN / REC (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER		
61	5								3	R4: Hard, fresh, fine grained, gray MARBLE with faint to distinct, very thin, sub-vertical foliation: smooth to rough, very close, moderately dipping to sub-vertical, secondary, pyrite and calcite crystals, iron-oxide stained joints/fractures.																		2	
62	4								3																				3
63	5								4	63.5'-65.0': Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: very close to moderately close, sub-vertical, pitted, slightly weathered, iron-oxide stained joints/fractures.																			2
64	5								3																				1
65	4	R5	64-69			5.0/5.0	100	20	4	R5: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: very close to moderately close, sub-vertical, pitted, slightly weathered, iron-oxide stained joints/fractures.																		1	
66	4								4	66.9'-70.6': Fracture Zone, smooth, very close, sub-vertical, iron-oxide stained joints/fractures.																		10	
67	5								4																				2
68	5								4																				7
69	5								4																				10
70	4	R6	69-74			5.0/5.0	100	60	5	R6: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: rough to smooth, very close to moderately close joints/fractures.																		5	
71	5								4																				5
72	5.5								5	72.7'-75.5': Fracture zone, smooth, very close, moderately close to sub-vertical, iron-oxide stained joints/fractures.	FZ																	1	
73	6								4																				4
74	6								4																				10
75	4	R7	74-79			5.0/5.0	100	64	3	R7: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation, very close, moderately dipping to sub-vertical, iron-oxide stained joints/fractures.	FZ																	5	
76	3								3																				6
77	4								4																				0
78	4								3																				1
79	4								5																				7
80	4	R8	79-84			5.0/5.0	100	76	5	R8: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close, moderately dipping to sub-vertical, joints/fractures.																			3
81	4								5																				4
82	4								5	81.6'-82.9': Fracture zone, smooth, very close, sub-vertical, iron-oxide stained joints/fractures.	FZ																	2	
83	5								4																				6
84	4								5																				0
85	4	R10	84-89			5.0/5.0	100	96	4	R9: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: rough to smooth, very close to moderately close, moderately dipping to sub-vertical, slightly weathered, iron-oxide stained joints/fractures.																			1
86	4								5																				2
87	5								5																				0
88	4								5																				0
89	4								5																				0
90	4	R10	89-104			5.0/5.0	100	73	5																				1

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:

BORING LOG													SH. 5 OF 7																								
													Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY						BORING NO. MW - 62 <small>Reviewed by: M.A. Pontl, Jr. - D. Schipper</small> <small>PROJECT NO.: 41.0017869.10</small> <small>G. SURF. EL. 14.89 feet</small> <small>DATUM: NGVD 1929</small> <small>FINAL BORING DEPTH: 201 feet</small>																		
													<small>DRILLING RIG MODEL: CME 550 Truck Rig</small> <small>SAMPLER HAMMER: 140 lbs Automatic</small> <small>CASING SIZE: 6-inch diameter (SW)</small> <small>CASING HAMMER: 300 lbs Automatic</small> <small>ROCK CORE: 3 7/8-inch diameter (HQ) core barrel</small>						<small>BORING CO.: Aquafer Drilling and Testing</small> <small>FOREMAN: Paul Gaddis</small> <small>ENGINEER: Maurice Pontl/Wendy Barry</small> <small>DATE START: 8/17/06</small> <small>DATE END:</small>						<small>GROUND WATER READINGS</small> <small>DATE: DEPTH: CASING: STABILIZATION TIME:</small> <small>Refer to Table 6.1 for Groundwater Data</small>												
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC (IN / IN)	ROCK PEN. / REC (FT / FT)	TOTAL CORE REC (%)	RCD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																							
														HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT													
														see below for values					see below for values					see below for values													
														1	2	3	4	5	1	2	3	4	5	1	2	3	4	5									
121	4									4	R16: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close, moderately dipping, slightly weathered, calcite mineralized joints/fractures; healed breccia.																										
122	5									4																											
123	4									4																											
124	4									4																											
125	3	R17	124-129			5.0/5.0		100	100	4	R17: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close, moderately dipping to sub-horizontal, pyrite mineralized, iron-oxide stained joints/fractures; trace pitted texture along calcite mineralized joints/fractures; 128.8": Discontinuous vug 1/8" wide, 1/4" deep, 1" long.																										
126	4									4																											
127	3									4																											
128	3									4																											
129	3									4																											
130	3	R18	129-134			5.0/5.0		100	100	3	R18: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures; occasional pitted texture along calcite mineralized joint/fracture.																										
131	3									3																											
132	3									4																											
133	3									3																											
134	3									3																											
135	3	R19	134-139			5.0/5.0		100	100	3	R19: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: very close, horizontal, slightly weathered joint/fracture.																										
136	3									3																											
137	3									3																											
138	4									3																											
139	3									3																											
140	3	R20	139-144			5.0/5.0		100	100	2	R20: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: rough, moderately close, moderately dipping, pyrite mineralized, slightly weathered joints/fractures.																										
141	3									3																											
142	4									2																											
143	3									2																											
144	3									2																											
145	3	R21	144-149			5.0/5.0		100	100	2	R21: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: and no apparent joints/fractures.																										
146	3									2																											
147	3									1																											
148	4									2																											
149	3									1																											
150	3	R22	149-154			5.0/5.0		100	100	2																											

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			NO. PER FT		SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	2-10	1'-3"	MOD CLOSE/MOD THICK	35°-85°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	10-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:

BORING LOG

SH.1 of 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 63

Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO: 41.0017869.10	COORDINATES:
G. SURF. EL. 14.18 feet	NORTH: 462988.86
DATUM: NGVD 1929	EAST: 604252.14
FINAL BORING DEPTH: 201 feet	


DRILL RIG MODEL: CME 550 Truck Rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS			
SAMPLER HAMMER: 140 lbs Automatic/300 lbs Donut		FOREMAN: Paul Gaddis		DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW)		ENGINEER: Wendell Barry		Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: 300 lbs Automatic		DATE START: 8/30/06					
ROCK CORE: HQ core barrel		DATE END:					

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN)	ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fracture Zone Observed	NOTES	IN SITU PROPERTIES													
														HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT			
														see below for values					see below for values					see below for values			
(No soil samples taken from 0 to 8 feet)																											
10		S1	8-10	2 - 2	7	24/8				77	S1: Loose, brown-gray, fine to medium GRAVEL and fine to coarse SAND, little Silt.																
10		S2	10.0-11.5	7 - 8	18	18/9				176	S2: Medium dense, brown-gray, fine to medium GRAVEL, some fine to coarse Sand, trace Silt, Brick and Metal.	1															
10		S3	12-14	8 - 7	13	24/11				129	S3: Medium dense, brown-gray, fine to medium GRAVEL and fine to coarse SAND, trace Silt.	2															
15		S4	14-16	9 - 8	14	24/9				133	S4: Medium dense, brown-gray, fine to medium GRAVEL, little fine to coarse Sand, trace Silt.																
15		S5	16-18	4 - 2	4	24/9					S5: Very loose brown-gray GRAVEL, little Sand, trace Silt.																
20		S6	18-20	2 - 2	5	24/7				212	S6: Medium stiff, brown-gray Clayey SILT, medium GRAVEL.																
20		S7	20-22	WH - 2	4	24/24				81	S7: Medium stiff, gray CLAY and SILT.																
20		S8	22-24	2 - 2	5	24/24				48	S8: Medium stiff, gray CLAY and SILT, trace Sand.																
25		S9	24-26	WH - WH	2	24/24					S9: Soft, gray Clayey SILT, trace Gravel and Sand.																
25		S10	26-28	1 - 3	2	24/8					S10: Soft, gray, CLAY and SILT, trace Gravel.																
30		S11	28-30	4 - 12	42	24/12				73	S11: Hard, gray SILT and CLAY, trace Sand.																

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS						
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING	NO. PER FT		SPACING/THICKNES		ANGLE	ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
1. Performed 8-inch diameter vacuum excavation from 0 to 8 feet.
2. Spun or drove and washed 4-inch diameter (HW) casing to sampling depths from 8 to 34 feet.

BORING NO. MW-63

BORING LOG												BORING NO. MW - 63		SH. 2 of 7														
				Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY				Reviewed by: M.A. Panti, Jr. - D. Schipper PROJECT NO: 41.0017869.10 COORDINATES: G. SURF. EL. 14.18 feet NORTH: 462988.86 DATUM: NGVD 1929 EAST: 604252.14 FINAL BORING DEPTH: 201 feet																				
								DRILL RIG MODEL: CME 550 Truck Rig		BORING CO.: Aquifer Drilling and Testing		DATE		DEPTH		CASING		STABILIZATION TIME										
SAMPLER HAMMER: 140 lbs Automatic/300 lbs Donut				FOREMAN: Paul Gaddis				Refer to Table 6.1 for Groundwater Data																				
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW)				ENGINEER: Wendell Barry																								
CASING HAMMER: 300 lbs Automatic				DATE START: 8/30/06																								
ROCK CORE: HQ core barrel				DATE END:																								
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC (IN / IN) ROCK PEN / REC (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fracture Zone Observed	NOTES	IN SITU PROPERTIES															NO. OF FRACTURES PER FOOT
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
												see below for values					see below for values					see below for values						
												1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER		
S12: Very dense, gray SAND, some Gravel, little Silt.																												
Top of Bedrock at 32 feet																												
S13: Gray Gravel.																												
35																												
S14: No recovery.																												
3																												
R1: Hard, fresh, fine grained gray, MARBLE with faint, very thin, sub-vertical foliation; rough to smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures;												FZ															12	
36.0'-81.0' : Fraction zone: rough to smooth, very close to close, sub-horizontal to vertical, iron-oxide stained joints/fractures												FZ															12	
4												FZ															20	
3												FZ															8	
3												FZ															10	
2												FZ															2	
R2: Hard, fresh, fine grained, gray MARBLE with no apparent foliation; rough to smooth, very close, moderately dipping to sub-vertical, iron-oxides stained joints/fractures.												FZ															7	
3												FZ															7	
3												FZ															7	
4												FZ															6	
3												FZ															6	
3												FZ															5	
R3: Hard, fresh, fine grained gray, MARBLE with no apparent foliation, rough to smooth, very close to close, moderately dipping to vertical, iron-oxide stained joints/fractures; healed breccia.												FZ															5	
3												FZ															5	
4												FZ															4	
3												FZ															2	
3												FZ															2	
3												FZ															1	
4												FZ															2	
3												FZ															6	
4												FZ															1	
4												FZ															10	
3												FZ															12	
R4: Hard, fresh, fine grained, gray, MARBLE with no apparent foliation; rough to smooth, very close to close, moderately dipping to vertical, calcite mineralized joints/fractures.												FZ															2	
55.1'-56.0' : Brown fine SAND on the face of fractures.												FZ															6	
4												FZ															1	
4												FZ															10	
4												FZ															8	
4												FZ															5	
R5: Hard, fresh, fine grained, gray MARBLE with no apparent foliation; rough to smooth, very close, moderately dipping to sub-vertical iron-oxide stained joints/fractures.												FZ															2	
4												FZ															2	
4												FZ															0	
60												FZ															0	
GRANULAR SOILS				COHESIVE SOILS				ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS																
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT	SPACING/THICKNES				ANGLE	ATTITUDE														
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN				0°-5°	HORIZONTAL														
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2) 1-2	2"-1" CLOSE/THIN				5°-35°	SUB-HORIZONTAL														
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK				35°-65°	MOD DIPPING														
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4) 11-30	3"-10" WIDE/THICK				55°-85°	SUB-VERTICAL														
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH		>10" VERY WIDE/VERY THICK				85°-90°	VERTICAL														
>30			HARD																									
NOTES: 3. Removed HW casing from the borehole. Installed 6-inch diameter (SW) casing. Set SW casing into bedrock at 38 feet with grout. Top of bedrock at about 32 feet.																												
												BORING NO.				MW-63												

BORING LOG

SH. 5 of 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING NO. MW - 63

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869 10 COORDINATES:
G. SURF. EL. 14.18 feet NORTH: 462968.86
DATUM: NAD 83 EAST: 604252.14
FINAL BORING DEPTH: 201 feet

DRILL RIG MODEL: CME 550 Truck Rig BORING CO.: Aquifer Drilling and Testing GROUND WATER READINGS
SAMPLER HAMMER: 140 lbs Automatic/300 lbs Donut FOREMAN: Paul Gaddis DATE DEPTH CASING STABILIZATION TIME
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW) ENGINEER: Wendell Barry Refer to Table 6.1 for Groundwater Data
CASING HAMMER: 300 lbs Automatic DATE START: 8/30/06
ROCK CORE: HQ core barrel DATE END:

Table with columns: DEPTH (FT), CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH (FT), BLOWS / 6 INCH, N VALUE, SOIL PEN / REC (IN / IN) ROCK PEN / REC (F / FT), TOTAL CORE REC (%), ROD (%), DRILLING FLUIDS LOST (GALLONS), SAMPLE DESCRIPTION, Fracture Zone Observed, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT. Includes entries for R18, R19, R20, R21, R22, and R23.

Summary table with columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS, JOINT/FRACTURE CHARACTERISTICS. Sub-columns include BPF, DENSITY, CONSISTENCY, HARDNESS, WEATHERING, NO. PER FT, SPACING/THICKNESS, ANGLE, ATTITUDE.

NOTES:
7. No drilling fluid returned during advancement between 120 and 150 feet.

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING NO. MW - 63


Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO: 41.0017869.10	COORDINATES:
G. SURF. EL. 14.18 feet	NORTH: 482988.88
DATUM: NGVD 1929	EAST: 604252.14
FINAL BORING DEPTH: 201 feet	

DRILL RIG MODEL: CME 550 Truck Rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER HAMMER: 140 lbs Automatic/300 lbs Donut	FOREMAN: Paul Gaddis	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (SW)	ENGINEER: Wendell Barry	CASING	STABILIZATION TIME
CASING HAMMER: 300 lbs Automatic	DATE START: 8/30/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: HQ core barrel	DATE END:		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT/FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fracture Zone Observed	NOTES	IN SITU PROPERTIES																
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
4									50			8	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	NUMBER	
4		R24	151-156			5.0/5.0	100	82	50	R24: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation, rough to smooth, very close, sub-vertical, healed, calcite mineralized, pitted joints.																			0
4									50																				0
4									50																				0
155									50																				0
5									50																				3
5		R25	156-161			5.0/5.0	100	87	50	R25: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation; smooth, close to moderately close, moderately dipping, to sub-vertical, with slightly weathered, joints/fractures.																			1
4									50																				0
4									50																				0
160									50																				0
4									50																				2
4		R26	161-166			5.0/5.0	100	72	50	R26: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation, rough to smooth, very close, to moderately close, moderately dipping to sub-vertical, slightly weathered joints/fractures.																			1
4									50																				1
165									50	163.1-164.4" Fracture zone; rough to smooth, very close, to moderately close, moderately dipping to sub-vertical, slightly weathered joints/fractures.	FZ																		9
4									50																				5
4									50																				0
4		R27	166-171			5.0/5.0	100	84	50	R27: Hard, fresh, fine grained gray MARBLE with faint, very thin to thin, sub-vertical foliation, rough to smooth, very close to wide moderately dipping to sub-vertical, slightly weathered joints/fractures; slightly pitted.																			2
4									50																				3
170									50																				0
4									50																				1
5									50																				0
4		R28	171-176			5.0/5.0	100	100	50	R28: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation, rough, very close, sub-vertical slightly weathered joints/fractures; slightly pitted texture along calcite mineralized joints/fractures.																			1
4									50																				0
175									50																				1
5									50																				0
4									50																				1
4		R29	176-181			5.0/5.0	100	90	50	R29: Hard, fresh, fine grained, gray MARBLE, with faint foliation; smooth very close to moderately close, moderately dipping to sub-vertical, slightly weathered joints/fractures.																			0
4									50																				3
4									50																				0
180									50																				2

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNES		ANGLE / ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 8. No drilling fluid return during advancement between 150 and 181 feet.

BORING LOG														SH. 7 of 7														
				Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY						BORING NO. MW - 63 Reviewed by: M.A. Ponti, Jr. - D. Schipper PROJECT NO: 41.0017869.10 COORDINATES: G. SURF. EL. 14.18 feet NORTH: 462968.86 DATUM: NGVD 1929 EAST: 604252.14 FINAL BORING DEPTH: 201 feet																		
										DRILL RIG MODEL: CME 550 Truck Rig						BORING CO.: Aquifer Drilling and Testing						GROUND WATER READINGS						
										SAMPLER HAMMER: 140 lbs Automatic/300 lbs Donut						FOREMAN: Paul Gaddis						DATE						
CASING SIZE: 4-inch diameter (HW) and 6-inch diameter (5W)						ENGINEER: Wendell Barry						Refer to Table 6.1 for Groundwater Data																
CASING HAMMER: 300 lbs Automatic						DATE START: 8/30/06																						
ROCK CORE: HQ core bit/retl						DATE END:																						
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fracture Zone Observed	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
4									50																			0
4	R30	181-186				5.0/5.0	100	82	50	R30: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation, very close to moderately close, sub-horizontal to sub-vertical slightly weathered joints/fractures.																	1	
4									50																			2
4									50																			1
185	4								50																			1
4									50																			0
3	R31	186-191				5.0/1.6	32	0	50	R31: Hard, fresh, fine grained, gray MARBLE with faint, very thin to thin, sub-vertical foliation: rough, very close to close, joints/fractures.																	0	
3									50																			0
3									50																			NA
190	2								50																			NA
3									50																			NA
3	R32	191-196				5.0/0.5	10	0	50	R32: Hard, fresh, fine grained, gray fragments of MARBLE with apparent foliation.																		0
3									50																			0
2									50																			NA
195	3								50																			NA
2									50																			0
3	R33	196-201				5.0/5.0	100	92	50	R33: Hard, fresh, fine grained gray MARBLE with faint foliation, smooth very close to wide, moderately dipping to sub-vertical slightly weathered joints/fractures.																	0	
3									50																			0
3									50																			0
200	3								50																			0
3									50																			0
									50	End of boring at 201 feet		9																5
205																												
210																												

COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS							
BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT			SPACING/THICKNES			ANGLE ATTITUDE	
<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°		HORIZONTAL	
2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-11"	CLOSE/THIN	0°-35°		SUB-HORIZONTAL	
4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD. CLOSE/MOD. THICK	35°-65°		MOD. DIPPING	
8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	65°-85°		SUB-VERTICAL	
15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	85°-90°		VERTICAL	
>30	HARD												

NOTES:
 9. Waterloo multi-level sampling system installed within the borehole (refer to installation log for details). Also monitoring wells installed within the overburden soils adjacent to the 201-foot borehole (refer to installation log for details).

BORING NO. MW-63

BORING LOG

SH. 1 of 3



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-65

Reviewed by: M.A. Pontil, Jr. - D. Schipper
 PROJECT NO.: 41.0017869.00 COORDINATES:
 G. SURF. EL. 69.72 feet NORTH: 462489.68
 DATUM: NGVD 1929 EAST: 604851.98
 FINAL BORING DEPTH: 83 feet

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: 3-inch spst spoon	FOREMAN: Ed Berner	DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)	ENGINEER: Anton Gallas	CASING	STABILIZATION TIME
CASING HAMMER: N.A.	DATE START: 8/16/06	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: HQ wireline	DATE END: 8/21/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC. (%)	RQD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES					NO. OF FRACTURES PER FOOT								
													HARDNESS					WEATHERING					see below for values			
													1	2	3	4	5	1	2	3	4	5	1	2	3	4
(No soil samples taken from 0 to 8 feet)																										
5																										
10		S1	8	50/0.5"		0/0				S1: No recovery																
		S2	10-11.2	9 - 14		24/18				S2: Dense, brown, fine to medium SAND, some rock fragments, little Silt.		1														
		S3	12	50/2"						S3: No recovery		2														
15		S4	16-18	6 - 7		24/18				S4: Medium dense, brown, fine to medium SAND, some rock fragments, trace Silt.																
				10 - 50																						
20		S5	20-22	6 - 10		24/6				S5: Medium dense, gray rock fragments.																
		S6	22-23.8	12 - 11		18/11				S6: Dense, brown-gray fine GRAVEL, some Sand, little Silt.																
		S7	24-26	3/24"		24/6				S7: 24.0'-24.5': Loose brown fine to coarse SAND, trace gravel, some Silt.		3														
25																										
30																										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-4" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1"-3" MOD CLOSE/MOD THICK	35°-65°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3"-10" WIDE/THICK	65°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD							

NOTES:
 1. Performed 8-inch diameter vacuum excavation from 0 to 8 feet.
 2. Spun and washed 4-inch diameter (HW) casing to sampling depths from 8 to 24 feet.
 3. Spun and washed HW casing to 38 feet and set in bedrock with grout. Bedrock encountered at 35 feet.

BORING NO. MW-65

BORING LOG

SH.2 of 3



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING No. MW-65

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.00

COORDINATES:

G. SURF. EL. 69.72 feet

NORTH: 462489.68

DATUM: NGVD 1929

EAST: 604851.98

FINAL BORING DEPTH: 83 feet

DRILLING RIG MODEL: CME 55 Truck rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS	
SAMPLER: 3-inch split spoon		FOREMAN: Ed Bomer		DATE	DEPTH
CASING SIZE: 4-inch diameter (HW)		ENGINEER: Anton Galias		CASING	STABILIZATION TIME
CASING HAMMER: N.A.		DATE START: 8/18/06		Refer to Table 6.1 for Groundwater Data	
ROCK CORE: HQ wireline		DATE END: 8/21/06			

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN/REC. (F / FT)	TOTAL CORE REC (%)	RGD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
35										Top of Bedrock at 35 feet																	
40	3	R1	38-43			5.0/4.8	95	96	4	R1: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping to sub-vertical, convoluted foliation; slightly to moderately rough, close to wide, sub-horizontal, slightly weathered iron-oxide stained joints/fractures;	FZ																
	4																										
	5									38.6'-39.2': Fracture zone: slightly to moderate rough, very close, sub-horizontal; slightly weathered, iron-oxide stained, joints/fractures.																	
	5																										
	5																										
45	3	R2	43-48			5.0/5.0	100	96	4	R2: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping to sub-vertical, convoluted foliation, smooth, very close to moderately close, sub-horizontal, slightly weathered, iron-oxide stained joints/fractures.																	
	3																										
	3																										
	3																										
	3	R3	48-53			5.0/5.0	100	100	2	R3: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping, to sub-vertical, convoluted foliation; one smooth, moderately close, sub-horizontal to sub-vertical, iron-oxide stained joint/fracture.																	
50	3																										
	4																										
	3																										
	4																										
	3	R4	53-58			5.0/5.0	100	100	2	R4: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping to sub-vertical, convoluted foliation, no apparent joints/fractures.																	
55	2																										
	3																										
	2																										
	3																										
	3																										
	2	R5	58-63			5.0/5.0	100	100	2	R5: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping to sub-vertical, convoluted foliation, no apparent joints/fractures.																	
60	2																										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS		
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNES	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK	35°-65°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD						

 NOTES:
 4. Lost approximately 750 gallons while drilling between 26 and 35 feet.

BORING NO. MW-65

BORING LOG

SH.3 of 3

	Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY	BORING No. MW-65 Reviewed by: M.A. Ponti, Jr. - D. Schipper PROJECT NO: 41,0017869.00 G. SURF. EL. 69.72 feet DATUM: NGVD 1929 FINAL BORING DEPTH: 83 feet
	COORDINATES: NORTH: 452489.68 EAST: 604851.98	

DRILLING RIG MODEL: CME 55 Truck rig SAMPLER: 3-inch split spoon CASING SIZE: 4-inch diameter (HW) CASING HAMMER: N.A. ROCK CORE: HQ wireline	BORING CO.: Aquifer Drilling and Testing FOREMAN: Ed Bomer ENGINEER: Anton Gallas DATE START: 8/18/06 DATE END: 8/21/06	GROUND WATER READINGS DATE DEPTH CASING STABILIZATION TIME Refer to Table 6.1 for Groundwater Data
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DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUID LOSS (GALLONS)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
65													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
2									2																		0
3									1																		0
3									2																		0
4	R6	63-68				5.0/5.0	100	100	2	R6: Hard, fresh, fine grained, gray MARBLE, with faint to distinct, very thin, moderately dipping to sub-vertical foliation, slightly rough to smooth, moderately close to wide, sub-horizontal, slightly weathered, iron-oxide stained joints/fractures.		5															0
5									1																		0
4									2																		1
5									1																		1
5									2																		0
70																											0
2	R7	68-73				5.0/5.0	100	80	2	R7: Hard, fresh, fine grained, gray MARBLE with no apparent foliation, slightly rough to smooth, close to moderately close, sub-vertical to moderately dipping, iron-oxide stained joints/fractures.		6															0
3									1																		0
3									2	71.3'-73' fractured zone, smooth, very close to close, sub-horizontal, slightly weathered iron-oxide stained; joints/fractures.																	0
2									2									FZ									2
3									1									FZ									3
75																											0
2	R8	73-78				5.0/5.0	100	100	20	R8: Hard, fresh, fine grained, gray MARBLE, with faint, very thin, moderately dipping foliation, no apparent joints/fractures.																	0
3									30																		0
2									40																		0
3									40																		0
3									50																		0
80																											0
3	R9	78-83				5.0/5.0	100	100	31	R9: Hard, fresh, fine grained, gray MARBLE with moderately dipping foliation, no apparent joints/fractures.																	0
3									20																		0
4									5																		0
3									2																		0
3									3																		0
85										End of boring at 83 feet		7															0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2)	1-2	2"-3"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-6	M. STIFF	3	MODERATELY HARD	(3)	3-10	1'-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD								

NOTES:
 5. Borehole advanced using fourth gear between 38 and 63 feet, and third gear used between 83 and 68 feet
 6. Borehole advanced using fourth gear between 68 and 83 feet.
 7. Monitoring wells installed within borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.

BORING NO. MW-65

BORING LOG

SH. 1 of 7



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING No. MW-66

Reviewed by: M.A. Ponti, Jr. - D. Schipper

PROJECT NO: 41.0017869.10

COORDINATES:

G. SURF. EL. 14.02 feet

NORTH: 463150.28

DATUM: NGVD 1929

EAST: 604409.21

FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig

BORING CO.: Aquifer Drilling and Testing

GROUND WATER READINGS

SAMPLER: Split spoon

FOREMAN: Dave Carter

DATE DEPTH CASING STABILIZATION TIME

CASING SIZE: 5-inch diameter (PW)

ENGINEER: Maurice Ponti/Anton Galas/Neils Jensen (overburden well inst. 7/5/07)

Refer to Table 6.1 for Groundwater Data

CASING HAMMER: N.A.

DATE START: 11/17/06

DATE END: 12/1/06

ROCK CORE: 3 7/8-inch diameter (HO) wireline

Main table with columns: Depth (ft), Coring (min/ft), Sample / Core No., Sample Depth (ft), Blows / 6 inch, N Value, Soil Pen / Rec. (in / in), Rock Pen / Rec. (ft / ft), Total Core Rec. (%), Rod (%), Drilling Fluids Lost (Gallons), Sample Description, Fractured Zone Observed, Notes, In Situ Properties (Hardness, Weathering, No. of Fractures per Foot).

Summary table with columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS, JOINT/FRACTURE CHARACTERISTICS. Includes sub-headers for BPF, Density, Consistency, Hardness, Weathering, No. per Ft, Spacing/Thickness, Angle, Attitude.

NOTES: 1. Performed 9-inch diameter vacuum excavation from 0 to 7 feet. 2. Drove and washed 5-inch diameter (PW) casing to sampling depths from 7 to 37 feet. Soil samples obtained using 3-inch diameter split spoon sampler.

BORING LOG

SH. 2 of 7



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-66

Reviewed by: M.A. Ponti, Jr. - D. Schipper	COORDINATES:
PROJECT NO: 41.0017869.10	NORTH: 463150.28
G. SURF. EL. 14.02 feet	EAST: 604409.21
DATUM: NGVD 1929	
FINAL BORING DEPTH: 200 feet	

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquiler Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split spoon	FOREMAN: Dave Carter	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 5-inch diameter (PW)	ENGINEER: Maurice Ponti/Anton Gallas/Neils Jensen (overburden well inst. 7/5/07)	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 11/17/06		
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 12/1/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC.(FT/FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
31		S8	30-32	2 - 1		24/12				S8: Soft, dark gray, organic, Silty CLAY, trace organic fibers, trace shell fragments			1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
32				3 - 4																							
33																											
34																											
35																											
36		S9A	35-37	8 - 8		24/12				S9A: Medium dense, gray, fine to coarse SAND, some gravel, little silt																	
37				8 - 22						S9B: Dense, gray, fine to coarse SAND, some gravel, little silt																	
38		S9B	37.8	16 - 50/3"						Top of Bedrock at 37.5 feet																	
39																											
40																											
41	6	R1	40-45			5.0/3.5	70	22	10	R1: Moderately hard to hard, slightly weathered to fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close to close sub-horizontal to sub-vertical, iron-oxide stained joints/fractures; healed micro-breccia;	FZ																16
42	8								8	40.0'-43.2': Fracture zone: smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																16
43	3								10		FZ																3
44	7								8																		2
45	7								5																		NA
46	7	R2	45-50			5.0/5.0	100	10	7	R2: Hard to moderately hard, slightly weathered to fresh, fine grained gray MARBLE with faint, very thin, sub-vertical foliation: very close to close, sub-horizontal to sub-vertical, partly healed joints/fractures (healed breccia)	FZ																15
47	7								5	45.0'-57.0': Fracture Zone, smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																14
48	7								8		FZ																11
49	6								8		FZ																9
50	7								7		FZ																12
51	5	R3	50-55			5.0/5.0	100	16	6	R3: Hard, slightly weathered to fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close, sub-horizontal to vertical, iron-oxide stained joints/fractures (healed breccia);	FZ																12
52	6								5	45.0'-57.0': Fracture Zone, smooth to rough, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																13
53	6								4		FZ																9
54	6								3		FZ																4
55	5								5		FZ																12
56	5	R4	55-60			5.0/5.0	100	32	3	R4: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth to rough, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures;	FZ																2
57	7								3		FZ																3
58	7								3	58.4'-60.6': Fracture Zone, smooth to rough, very close, sub-horizontal to vertical, sand-silt-clay coated, iron-oxide stained joints/fractures.																	1
59	6								4		FZ																9
60	7								3		FZ																6

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS			
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO PER FT	SPACING/THICKNESS			
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2'-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3'-10'	WIDE/THICK	55°-65°	SUB-VERTICAL
>50	VERY DENSE	15-30	V STIFF	5 VERY HARD	5 FRESH		>10'	VERY WIDE/VERY THICK	65°-90°	VERTICAL

NOTES:
3. PW casing set into bedrock at 40 feet. Casing/rock interface sealed with grout. Top of bedrock at approximately 37.5 feet. NA denotes no data available.

BORING NO. MW-66

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-66

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.02 feet NORTH: 463150.28
DATUM: NGVD 1929 EAST: 604409.21
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig BORING CO.: Aqualter Drilling and Testing
SAMPLER: Split spoon FOREMAN: Dave Carter
CASING SIZE: 5-inch diameter (PW) ENGINEER: Maurice Ponti/Anton Gattas/Neils Jensen (overburden well inst. 7/5/07)
CASING HAMMER: N.A. DATE START: 11/17/06
ROCK CORE: 3 7/8-inch diameter (HQ) wireline DATE END: 12/1/06

GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 8 INCH	N VALUE	SOIL PEN. / REC.(IN/IN) ROCK PEN/REC.(FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES																
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT						
													see below for values					see below for values					see below for values						
91	5	R11	90-95			5.0/5.0	100	76	5	R11: Hard, fresh, fine grained, gray brecciated MARBLE, with faint, very thin, sub-vertical foliation: smooth to rough, very close to moderately close, sub-vertical to sub-horizontal, iron-oxide stained joints/fractures; trace pitted texture along calcite mineralized joints/fractures.			1	2	3	4	5	1	2	3	4	5	1	2	3	4	13		
92	5								6																			1	
93	6								6																			0	
94	6								6																		1		
95	6								5																		3		
96	5	R12	95-100			5.0/5.0	100	66	6	R12: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures; 95.0'-96.8': Fracture zone, smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/fractures.	FZ																8		
97	5								4			FZ																12	
98	5								8																			0	
99	6								4																		0		
100	5								6																		0		
101	6	R13	100-105			5.0/5.0	100	70	6	R13: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to sub-vertical, healed, silty, iron-oxide stained joints/fractures; 102.5'-103.2': Fracture zone: smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained 104.3'-105.5': Fracture zone: smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained																			1
102	6								5																				12
103	6								10			FZ																2	
104	7								15																		1		
105	6								20		FZ																10		
106	8	R14	105-110			5.0/5.0	100	66	10	R14: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to sub-vertical, silty, iron-oxide stained joints/fractures; 108.1'-113.4': Fracture zone, smooth, very close to close, sub-vertical to moderately dipping, iron-oxide stained joints/fractures.	FZ																	4	
107	8								10																				4
108	8								15																			0	
109	6								20		FZ																9		
110	7								20		FZ																7		
111	6	R15	110-115			5.0/5.0	100	70	20	R15: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, moderately dipping to sub-vertical, healed, iron-oxide stained joints/fractures.	FZ																	6	
112	7								20																				15
113	7								20			FZ																12	
114	7								15																		4		
115	7								10																		4		
116	7	R16	115-120			5.0/5.0	100	0	20	R16: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close, moderately dipping to sub-vertical, iron-oxide stained, joints/fractures; 116.5'-119.3': Fracture zone, smooth, very close, sub-vertical to vertical, iron-oxide stained joints/fractures.																			2
117	7								20			FZ																	6
118	7								20																				14
119	8								20		FZ																	10	
120	8								15																			1	

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS			
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1) 0	<2" VERY CLOSE/VERY THIN	0-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2) 1-2	2"-1" CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3) 3-10	1"-3" MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4) 11-20	3"-10" WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH		>10" VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD						

NOTES:

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-66

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.02 feet NORTH: 463150.28
DATUM: NGVD 1929 EAST: 604409.21
FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split spoon	FOREMAN: Dave Carter	DATE	DEPTH CASING STABILIZATION TIME
CASING SIZE: 5-inch diameter (PW)	ENGINEER: Maurice Ponti/Anton Gallas/Neils Jensen (overburden well inst. 7/5/07)	Refer to Table 6.1 for Groundwater Data	
CASING HAMMER: N.A.	DATE START: 11/17/06		
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 12/4/06		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
121	6	R17	120-125			5.0/5.0	100	100	20	R17: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures.			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	0
122	6								20																			0
123	6								20																			0
124	7								40																			0
125	6								25																			0
126	7	R18	125-130			5.0/4.0	80	80	20	R18: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: close, sub-vertical to vertical, smooth, iron-oxide stained joints/fractures.																		0
127	6								20	128.5'-130': Sub-vertical to vertical, iron-oxide stained joints/fractures																		0
128	7								20																			0
129	7								30																			7
130	7								20																			7
131	5	R19	130-135			5.0/5.0	100	52	15	R19: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to vertical, iron-oxide stained joints/fractures;																		2
132	5								15	130.9'-145.0': Fracture zone, smooth, very close to close, sub-horizontal to vertical, iron-oxide stained joints/fractures.	FZ																	2
133	5								20		FZ																	5
134	4								20		FZ																	12
135	5								20		FZ																	8
136	4	R20	135-140			5.0/5.0	100	20	20	R20: Hard, fresh, fine grained, gray MARBLE with very thin, sub-vertical foliation: smooth, very close to close, sub-horizontal to vertical, iron-oxide stained joints/fractures.	FZ																	10
137	7								20		FZ																	12
138	4								20		FZ																	4
139	5								20		FZ																	6
140	7								20		FZ																	12
141	5	R21	140-145			5.0/5.0	100	28	20	R21: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: smooth, very close to close sub-horizontal to sub-vertical, iron-oxide stained, joints/fractures.	FZ																	3
142	5								20		FZ																	3
143	5								20		FZ																	4
144	6								30		FZ																	10
145	8								30		FZ																	7
146	5	R22	145-150			5.0/5.0	100	100	20	R22: Hard, fresh, fine grained, gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures.																		0
147	5								15																			0
148	6								15																			0
149	5								15																			0
150	6								15																			0

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS			JOINT/FRACTURE CHARACTERISTICS		
BFF	DENSITY	BFF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH		
		>30	HARD						

NOTES:

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-66

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. 14.02 feet NORTH: 463150.28
 DATUM: NGVD 1929 EAST: 604409.21
 FINAL BORING DEPTH: 200 feet

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER: Split spoon	FOREMAN: Dave Carter	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 5-inch diameter (PW)	ENGINEER: Maurice Ponti/Anton Galas/Nells Jensen (overburden well inst. 7/5/07)	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N.A.	DATE START: 11/17/06				
ROCK CORE: 3 7/8-inch diameter (HQ) wireline	DATE END: 12/1/06				

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN./REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES																	
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT							
													see below for values					see below for values					see below for values							
181	7	R29	180-185			5.0/5.0	100	100	20	R29: Hard, fresh, fine grained, dark gray MARBLE with faint, very thin, sub-vertical foliation: smooth, moderately close, moderately dipping to sub-vertical, slightly weathered, iron-oxide stained joint/fracture.			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	0		
182	6								20																				1	
183	7								20																				0	
184	6								20																				0	
185	7								30																				0	
186	7	R30	185-190			5.0/2.2	44	44	20	R30: Hard, fresh, fine grained, dark gray MARBLE with faint, very thin, sub-vertical foliation: no apparent joints/fractures.		4																NA		
187	7								20																				NA	
188	10								20																				NA	
189	11								20																				0	
190	10								20																				0	
191	6	R31	190-195			5.0/4.7	94	88	15	R31: Hard, fresh, fine grained, dark gray MARBLE with faint, very thin, sub-vertical foliation: smooth, moderately close, sub-vertical, slightly weathered joints/fractures.																		0		
192	7								15																				0	
193	6								15																				1	
194	6								15																				2	
195	7								15																				0	
196	7	R32	195-200			5.0/4.1	100	82	15	R32: Hard, fresh, fine grained, dark gray MARBLE with faint, very thin, sub-vertical foliation: smooth, moderately close, sub-vertical, slightly weathered joints/fractures.																		0		
197	6								15																				0	
198	6								20																				1	
199	6								15																				0	
200	6								15																				0	
201										End of Boring at 200 feet										5, 6										

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT/FRACTURE CHARACTERISTICS							
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT				SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1 VERY SOFT	1 COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL		
4-10	LOOSE	2-4	SOFT	2 MEDIUM	2 SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL		
10-30	MEDIUM DENSE	4-8	M. STIFF	3 MODERATELY HARD	3 MODERATE	(3)	3-10	1"-3"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING		
30-50	DENSE	8-15	STIFF	4 HARD	4 SLIGHT	(4)	11-20	3"-10"	WIDE/THICK	55°-85°	SUB-VERTICAL		
>50	VERY DENSE	15-30	V. STIFF	5 VERY HARD	5 FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL		

NOTES:
 4. HQ core barrel malfunctioned, a piece of rock was jammed between inner and outside core barrels; catcher malfunctioned leaving core sample in borehole; replaced HQ core sampler; readvanced between 185' and 190' with only 2.2' recovered; RQD based on 2.2' recovered
 5. Monitoring wells installed within the overburden soils adjacent to the borehole (refer to installation log for details); 2-foot by 2-foot by 2-foot well vault installed within concrete, flush with the ground surface.
 6. Flute liner was installed within the 200-foot open rock borehole.

BORING LOG



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-67

Reviewed by: M.A. Ponti, Jr. - D. Schipper	COORDINATES:		
PROJECT NO: 41.0017869.10	G. SURF. EL. 14.36	NORTH:	6490.48
DATUM: NGVD 1929		EAST:	1129.65
FINAL BORING DEPTH: 350 feet			

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS			
SAMPLER: Split Spoon	FOREMAN: Dave Carter	DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4" dia. (HW)	ENGINEER: Maurice Ponti	Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N/A	DATE START: 6/5/07				
ROCK CORE: 3 7/8-inch dia. (HQ)	DATE END: 8/28/07				

DEPTH (FT.)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
31				12-21																							
32		S-12	31-32.5	14-26						S-12: Very stiff, dark gray SILT and CLAY, some (-) fine Sand, trace medium Gravel.		3															
33				51						Top of Bedrock at approximately 33 feet																	
34	6	R-1	33-38			5/5	100	22	80	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub horizontal to subvertical, iron-oxide stained joints/ fractures.	FZ																>20
35	7																										>20
36	6									33'-48': Fracture zone: smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.	FZ																>20
37	5																										>20
38	5																										>20
39	4	R-2	38-43			5/5	100	8	120	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.	FZ															>20	
40	5																										>20
41	4																										>20
42	4																										>20
43	5																										>20
44	2	R-3	43-48			5/5	100	0	150	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.	FZ															>20	
45	4																										>20
46	5																										>20
47	6																										>20
48	5																										>20
49	5	R-4	48-53			5/5	100	100	80	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin to thin, moderately dipping foliation: smooth, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																1	
50	6																										2
51	6																										0
52	6																										2
53	6																										1
54	5	R-5	53.0-58.0			5/5	100	100	40	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																0	
55	5																										1
56	6																										1
57	6																										0
58	6																										1
59	5	R-6	58-63			5/5	100	58	120	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																9	
60	5																										8

Granular Soils		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE ATTITUDE	
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-4"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD. CLOSE/MOD THICK	35°-55°	MOD. DIPPING
30-50	DENSE	6-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
 3. ROD affected by sub-vertical joints/ fractures.
 4. Fractures per foot affected by sub-vertical joints/ fractures.

BORING LOG

SH. 3 of 12



Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY

BORING No. MW-67

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.38 NORTH: 6490.48
DATUM: NGVD 1929 EAST: 1129.85
FINAL BORING DEPTH: 350 feet

DRILLING RIG MODEL: CME 55 Truck rig		BORING CO.: Aquifer Drilling and Testing		GROUND WATER READINGS			
SAMPLER: Split Spoon		FOREMAN: Dave Carter		DATE	DEPTH	CASING	STABILIZATION TIME
CASING SIZE: 4" dia. (HW)		ENGINEER: Maurice Ponti		Refer to Table 6.1 for Groundwater Data			
CASING HAMMER: N/A		DATE START: 6/5/07					
ROCK CORE: 3 7/8-inch dia. (HQ)		DATE END: 6/26/07					

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN/IN) ROCK PEN. / REC. (F/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
61	6									58.2-61.1': Fracture zone, smooth, very close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures, slightly pitted discontinuous vugs, healed micro-brecciated zone between 60.9 and 61.1 feet.	FZ	5															11
62	7																										4
63	8																										0
64	3	R-7	63-68			5/5	100	94	60	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub horizontal to subvertical, iron-oxide stained joints/ fractures.																0	
65	4																										1
66	4									65.9-67.1': Fracture zone: smooth, very close to close, subvertical, iron-oxide stained joints/ fractures.																1	
67	6										FZ																3
68	6																										1
69	5	R-8	68-73			5/5	100	64	90	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close, sub-vertical to vertical, iron-oxide stained joints/ fractures; few pitted, calcified joints/ fractures.																2	
70	5									68.9-69.7-70.5-71.8': Fracture zone: smooth, very close, subvertical to vertical iron-oxide stained joints/ fractures.	FZ																8
71	7										FZ																6
72	7										FZ																7
73	7																										1
74	4	R-9	73-78			5/5	100	100	45	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: one, smooth, moderately close, slightly weathered joint/ fracture.																	0
75	5																										1
76	5																										0
77	5																										0
78	6																										0
79	4	R-10	78-83			5/5	100	100	40	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin to thin, moderately dipping foliation: smooth to rough, close, sub-horizontal to sub-vertical, slightly weathered joints/ fractures, slick on sides at 81 feet.																	0
80	4									79.7-80.8': Pitted texture along vertical, healed, calcite mineralized joints/ fractures.																	1
81	5																										1
82	6																										0
83	8																										0
84	3	R-11	83-88			5/5	100	53	60	Hard, fresh, gray, fine grained, MARBLE, with faint, very thin, moderately dipping foliation: smooth to rough, very close to close, sub-vertical, iron-oxide stained joints/ fractures.																	1
85	4									85.8-93': Fracture zone: smooth to rough, very close to close, subvertical, iron-oxide stained joints/ fractures.																	3
86	7																										4
87	4										FZ																5
88	7										FZ																7
89	3	R-12	88-91			3/3	100	17	110	Hard, fresh, gray, MARBLE, with faint, very thin, moderately dipping foliation: smooth, very close to close, sub-vertical, iron-oxide stained joints/ fractures.	FZ																12
90	4										FZ																7

Granular Soils		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	NO. PER FT	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL	
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(1)	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL	
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(2)	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING	
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(3)	3'-10'	WIDE/THICK	55°-85°	SUB-VERTICAL	
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH	(4)	>10'	VERY WIDE/VERY THICK	85°-90°	VERTICAL	
		>30	HARD										

NOTES:
4. Vigorous rapping of drill rod against casing observed during advancement between 81 and 83 feet; pulled drill rod, replaced 10 foot section; no rapping observed during R-7 core sampling.


BORING NO. MW-67

BORING LOG

SH. 4 of 12

Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY										BORING No. MW-67																	
										Reviewed by: M.A. Ponti, Jr. - D. Schipper																	
										PROJECT NO: 41.0017869.10					COORDINATES:												
										G. SURF. EL. 14.36					NORTH: 6490.48												
DRILLING RIG MODEL: CME 55 Truck rig										BORING CO.: Aquifer Drilling and Testing																	
SAMPLER: Spill Spoon										FOREMAN: Dave Carter																	
CASING SIZE: 4" dia. (HW)										ENGINEER: Maurice Ponti																	
CASING HAMMER: N/A										DATE START: 6/5/07																	
ROCK CORE: 3 7/8-inch dia. (HQ)										DATE END: 6/26/07																	
										GROUND WATER READINGS																	
										DATE		DEPTH		CASING		STABILIZATION TIME											
										Refer to Table 6.1 for Groundwater Data																	
DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	RCD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES														
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT				
													see below for values					see below for values					see below for values				
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER
91										No Recovery.	FZ													6			
92		R-13	91-93			2/0	0		30		FZ														14		
93											FZ															14	
94	4	R-14	93-94.5			1.5/1	60	0	20	R-14, R-15: Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.															3		
95	5																									3	
96	6	R-15	94.5-96.5			2/2	100	40	100																	7	
97	5																									4	
98	2	R-16	96.5-101.5			5/5	100	0	100	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide joints/ fractures.	FZ															15	
99	3									96.5-102: Fracture zone: smooth very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.	FZ															15	
100	3										FZ															15	
101	4										FZ															15	
102	3	R-17	101.5-106.5			5/5	100	18	100	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide joints/ fractures.	FZ															15	
103	2									103-114.7: Fracture zone: smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																6	
104	2										FZ															8	
105	6										FZ															15	
106	3										FZ															6	
107	5	R-18	106.5-111.5			5/5	100	24	59	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide joints/ fractures, healed microbreccia; slightly pitted texture along white healed, calcite mineralized joints/ fractures.	FZ															6	
108	3										FZ															1	
109	3										FZ															10	
110	4										FZ															8	
111	5										FZ															8	
112	7	R-19	111.5-113.5			2/2	100	0	72	R-19, R-20: Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.	FZ															8	
113	6										FZ															8	
114	6	R-20	113.5-116.5			3/3	100	39	19		FZ															9	
115	6										FZ															2	
116	6																									5	
117	6	R-21	116.5-121.5			5/5	100	38	50	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																7	
118	5																									3	
119	4																									9	
120	4																									3	

BORING NO. MW-67

BORING LOG															BORING No. MW-67													
 Indian Point Energy Center Entergy Nuclear Northeast Buchanan, NY										Reviewed by: M.A. Ponti, Jr. - D. Schipper																		
										PROJECT NO: 41.0017869.10					COORDINATES: 6490.48 NORTH; 1129.65 EAST													
DRILLING RIG MODEL: CME 55 Truck rig										BORING CO.: Aquifer Drilling and Testing					GROUND WATER READINGS													
SAMPLER: Split Spoon										FOREMAN: Dave Carter					DATE													
CASING SIZE: 4" dia. (HW)										ENGINEER: Maurice Ponti					DEPTH													
CASING HAMMER: N/A										DATE START: 6/5/07					CASING													
ROCK CORE: 3 7/8-inch dia. (HQ)										DATE END: 6/28/07					STABILIZATION TIME													
										Refer to Table 6.1 for Groundwater Data																		
DEPTH (FT)	CORING (MIN/FT)	SAMPLE /CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 8 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (FT / FT)	TOTAL CORE REC (%)	RQD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
121	5																											6
122	4	R-22	121.5-126.5			5/5	100	27	40	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained joints/ fractures.																	1	
123	6																											4
124	6																											5
125	10																											10
126	6																											7
127	7	R-23	126.5-127.5			1/1	100	0		R-23, R-24: Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to close, moderately dipping to sub-vertical, iron-oxide stained joints/ fractures.																	8	
128	6	R-24	131.5			4/4	100	42	40																			2
129	5																											2
130	5																											7
131	6																											9
132	7	R-25	131.5-136.5			5/5	100	84	45	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation; smooth, very close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures, trace pitted texture along white, calcite mineralized joints/ fractures.																	4	
133	3																											3
134	4																											0
135	4																											0
136	6																											2
137	7	R-26	136.5-141.5			5/5	100	58	60	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to moderately close, sub-horizontal to moderately dipping, iron-oxide stained joints/ fractures.																	1	
138	4										FZ																	5
139	5									137-139.4': Fracture zone: smooth, very close to close, sub-horizontal to moderately dipping, iron-oxide stained joints/ fractures.	FZ																	5
140	5									139.2-143.6': Slightly pitted texture along, white, calcite mineralized joints/ fractures.	FZ																	1
141	4																											0
142	7	R-27	141.5-146.5			5/5	100	100	43	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, close to moderately close, sub-horizontal to sub-vertical, iron-oxide stained joints/ fractures.																	0	
143	5																											1
144	5																											1
145	6																											0
146	5																											0
147	6	S-28	146.5-151.5			5/1.5	30	30	74	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close, sub-vertical, iron-oxide stained joints/ fractures.																	N	
148	6											5																N
149	8																											N
150	5																											N

Granular Soils		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS:		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1"	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3"	MOD. CLOSE/MOD. THICK	35°-55°	MOD. DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10"	VERY WIDE/VERY THICK	85°-90°	VERTICAL

NOTES:
5. Mechanical discing features observed on pieces of rock core; RQD may not be indicative of in-situ conditions.
N - denotes no data available

BORING LOG

SH. 9 of 12



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-67

Reviewed by: M.A. Ponti, Jr. - D. Schipper	
PROJECT NO: 41.0017869.10	COORDINATES:
G. SURF. EL. 14.36	NORTH: 6490.48
DATUM: NGVD 1929	EAST: 1129.85
FINAL BORING DEPTH: 350 feet	

DRILLING RIG MODEL: CME 55 Truck rig	BORING CO.: Aquifer Drilling and Testing	GROUND WATER READINGS	
SAMPLER: Split Spoon	FOREMAN: Dave Carter	DATE	DEPTH
CASING SIZE: 4" dia. (HW)	ENGINEER: Maurice Ponti	CASING	STABILIZATION TIME
CASING HAMMER: N/A	DATE START: 6/5/07	Refer to Table 6.1 for Groundwater Data	
ROCK CORE: 3 7/8-inch dia. (HD)	DATE END: 6/26/07		

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC (IN / IN) ROCK PEN. / REC. (FT/FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER	
241	4	R-47	240-245			5/5	100	100	25	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping foliation, smooth, close to moderately close, sub-horizontal to sub-vertical, slightly weathered joints/ fractures.																	2	
242	5																											1
243	6																											0
244	8																											1
245	8																											0
246	6	R-48	245-250			5/5	100	100	30	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping to subvertical foliation, smooth, close, sub-vertical, slightly weathered, joints/ fractures. 246.4-247.4: Vugs along calcified sub-horizontal to sub-vertical, white, mineralized joints/ fractures, approximately 3/8" to 1/16" deep.																	0	
247	5																											0
248	5																											3
249	4																											0
250	5																											0
251	4	R-49	250-255			5/5	100	100	32	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping foliation, smooth, close to moderately close, moderately dipping to sub-horizontal, slightly weathered joints/ fractures.																	1	
252	4																											0
253	5																											2
254	2																											1
255	4																											0
256	5	R-50	255-260			5/5	100	100	46	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping foliation, one smooth, moderately close to widely spaced, sub-vertical, slightly weathered joints/ fractures.																	1	
257	6																											0
258	5																											0
259	5																											0
260	6																											0
261	6	R-51	260-265			5/5	100	100	45	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping foliation, smooth, close to widely spaced, sub-horizontal to sub-vertical, slightly weathered joints/ fractures.																	0	
262	6																											0
263	6																											0
264	5																											3
265	5																											0
266	6	R-52	265-270			5/5	100	94	10	Hard, fresh, gray, fine-grained MARBLE, with faint, very thin, moderately dipping foliation, smooth, very close to widely spaced, moderately dipping, slightly weathered joints/ fractures.																	0	
267	6																											4
268	6																											0
269	5																											0
270	5																											0

Granular Soils		COHESIVE SOILS		ROCK CORE CHARACTERISTICS					JOINT/FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING			SPACING/THICKNESS			ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-1'	CLOSE/THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	1'-3'	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	3'-10'	WIDE/THICK	55°-65°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>10'	VERY WIDE/VERY THICK	65°-90°	VERTICAL
		>30	HARD										

NOTES:

BORING NO. **MW-67**

BORING LOG

SH. 10 of 12



**Indian Point Energy Center
Entergy Nuclear Northeast
Buchanan, NY**

BORING No. MW-67

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10 COORDINATES:
G. SURF. EL. 14.36 NORTH: 6490.48
DATUM: NGVD 1929 EAST: 1129.65
FINAL BORING DEPTH: 350 feet

DRILLING RIG MODEL: CME 55 Truck rig BORING CO.: Aquifer Drilling and Testing GROUND WATER READINGS
SAMPLER: Split Spoon FOREMAN: Dave Carter DATE DEPTH CASING STABILIZATION TIME
CASING SIZE: 4" dia. (HW) ENGINEER: Maurice Pont Refer to Table 6.1 for Groundwater Data
CASING HAMMER: N/A DATE START: 6/5/07
ROCK CORE: 3 7/8-inch dia. (HQ) DATE END: 6/28/07

DEPTH (FT)	CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH (FT)	BLOWS / 6 INCH	N VALUE	SOIL PEN / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	DRILLING FLUIDS LOST (GALLONS)	SAMPLE DESCRIPTION	Fractured Zone Observed	NOTES	IN SITU PROPERTIES																				
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT										
													see below for values					see below for values					see below for values										
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER						
271	4	R-53	270-275			5/5	100	100	10	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, no apparent joints/ fractures. 271.7-273.8': trace pitted texture, vugs 1/16 to 3/8" deep along calcite mineralized joints/ fractures.																							0
272	4																															0	
273	5																															0	
274	5																															0	
275	5												7																			0	
276	6	R-54	275-280			5/5	100	100	25	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, two smooth, close to moderately close, horizontal to sub-vertical, slightly weathered joints/ fractures.																					0		
277	5																															0	
278	5																															0	
279	4																															2	
280	5																															0	
281	4	R-55	280-285			5/5	100	100	15	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping foliation, smooth, horizontal to moderately dipping, slightly weathered joints/ fractures, trace pitted texture along calcite mineralized joints/ fractures.																					1		
282	4																															1	
283	5																															0	
284	2																															1	
285	4																															0	
286	5	R-56	285-290			5/5	100	100	21	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping to sub-vertical foliation, smooth, close to widely spaced, moderately dipping to sub-horizontal, slightly weathered joints/ fractures.																						0	
287	6																															1	
288	5																															1	
289	5																															0	
290	6																															0	
291	6	R-57	290-295			5/5	100	100	29	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping to sub-vertical foliation, one smooth, widely spaced, sub-vertical, slightly weathered joints/ fractures.																						1	
292	6																															0	
293	6																															0	
294	5																															0	
295	5																															0	
296	6	R-58	295-300			5/5	100	100	30	Hard, fresh, gray, fine-grained, MARBLE, with faint, very thin, moderately dipping to sub-vertical foliation, one smooth, widely spaced, sub-vertical, slightly weathered joints/ fractures.																						0	
297	6																															0	
298	6																															1	
299	5																															0	
300	5																															0	

Granular Soils		COHESIVE SOILS		ROCK CORE CHARACTERISTICS				JOINT/FRACTURE CHARACTERISTICS					
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS		WEATHERING		NO. PER FT		SPACING/THICKNESS		ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	1	COMPLETE	(1)	0	<2"	VERY CLOSE/VERY THIN	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	2	SEVERE	(2)	1-2	2"-4"	CLOSE/MOD THIN	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	3	MODERATE	(3)	3-10	4"-6"	MOD CLOSE/MOD THICK	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	4	SLIGHT	(4)	11-20	6"-12"	WIDE/THICK	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD	5	FRESH			>12"	VERY WIDE/VERY THICK	85°-90°	VERTICAL
		>30	HARD										

NOTES:
7. Core barrel jammed inside wireline drill rod, removed drill rods and core barrel, changed wireline from 230 cable to 400 foot long cable, changed cutting bit and rock core catcher, advanced tools to sample R-54.

BORING NO. MW-67

BORING LOG



BORING NO. RW-1

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
G. SURF. EL: approx 79 feet
DATUM NGVD 29
FINAL BORING DEPTH (FT) 140

SAMPLER: Drilling Rig CME L55 Track Rig
SAMPLER HAMMER: N.A.
CASING SIZE: 6-inch diameter (SW)
CASING HAMMER: N.A.
ROCK CORE: N.A.

BORING CO.: ADT
FOREMAN: Ed Bomer
ENGINEERS: Anton Gallas, Sara Covelli
DATE START: 7/17/06
DATE END: 7/28/06

GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

Main data table with columns: DEPTH (FT), CASING (BPF/CORING), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 6 INCH, N VALUE, SOIL PEN. / REC. (IN / IN) / ROCK PEN / REC. (FT / FT), TOTAL CORE REC (%), ROD (%), Drilling Fluid Loss (Gallons), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Summary tables for GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS, JOINT FRACTURE CHARACTERISTICS, and HARDNESS/WEATHERING scales.

- NOTES:
1. Borehole advanced using 5 7/8" diameter tricone roller bit between 0 and 10 feet b/g.
2. 6-inch diameter (SW) casing installed and grouted between 0 and 10 feet b/g.
3. 4-inch diameter FLUTE LINER installed between 2 and 90 feet b/g inside adjacent well MW-30.
4. Borehole advanced from 10 to 140 feet using a 5 7/8-inch diameter rollerbit. No samples taken.
5. Drilling Parameters: RPM 1350; Roller Bit Pressure 550 psi; 2nd gear between 8 and 24 feet b/g.
6. Drilling Parameters: RPM 1550; Roller Bit Pressure 550 psi; 2nd gear between 24 and 28 feet b/g.

BORING LOG



BORING NO. RW-1

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. approx 79 feet NORTH: 463006.84
 DATUM NGVD 29 EAST: 604879.15
 FINAL BORING DEPTH (FT) 140

SAMPLER: Drilling Rig CME L55 Track Rig BORING CO.: ADT
 SAMPLER HAMMER: N.A. FOREMAN: Ed Bomer
 CASING SIZE: 6-inch diameter (SW) ENGINEERS: Anton Gallas, Sara Covelli
 CASING HAMMER: N.A. DATE START: 7/17/06
 ROCK CORE: N.A. DATE END: 7/28/06

GROUND WATER READINGS

DATE	DEPTH	CASING	STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data			

DEPTH (FT)	CASING (BPF) / CORING (MIN/FT)	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN. / REC. (F / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES															
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT					
													see below for values					see below for values					see below for values					
													1	2	3	4	5	1	2	3	4	5	1	2	3	4		
31	8									Bedrock		7																
32	18																											
33	18																											
34	17																											
35	15																											
36	17																											
37	15																											
38	14																											
39	12																											
40	11																											
41	13																											
42	12																											
43	16																											
44	15																											
45	14																											
46	9																											
47	10											8																
48	10																											
49	10																											
50	9											9																
51	14																											
52	15																											
53	13																											
54	11																											
55	8											10																
56	10																											
57	9																											
58	11																											
59	10																											
60	11																											

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT FRACTURE CHARACTERISTICS			
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT	SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1) 0	<2" Very close/Very thin	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2) 1-2	2"-1" Close/Thin	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	(3) 2-10	1"-3" Mod Close/Mod Thick	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	(4) 10-20	3"-10" Wide/Thick	55°-45°	SUB-VERTICAL
>50	VERY DENSE	>30	V. STIFF	5	VERY HARD		>10" Very Wide/Very Thick	85°-60°	VERTICAL

NOTES:
 7. Bedrock encountered at approximately 27.7 feet b.g.
 8. Used approximately 5 gallons of drilling fluid (tap water) between 30 and 47 feet b.g.
 9. Drilling parameters: 1350 RPM, Roller Bit Pressure 700 psi, 2nd gear between 30 and 50 feet b.g.
 10. Drilling parameters: 1450 RPM, Roller Bit Pressure 900 psi, 2nd gear between 50 and 60 feet b.g.

BORING LOG

SH. 3 OF 5



BORING NO. RW-1

Reviewed by: M.A. Ponti, Jr. - D. Schipper
 PROJECT NO: 41.0017869.10 COORDINATES:
 G. SURF. EL. approx 79 feet¹ NORTH: 463006.84
 DATUM NGVD 29 EAST: 604879.15
 FINAL BORING DEPTH (FT) 140

SAMPLER: Drilling Rig CME L55 Track Rig BORING CO.: ADT
 SAMPLER HAMMER: N.A. FOREMAN: Ed Borne
 CASING SIZE: 6-inch diameter (SW) ENGINEERS: Anton Gallas, Sara Covelli
 CASING HAMMER: N.A. DATE START: 7/17/06
 ROCK CORE: N.A. DATE END: 7/28/06

GROUND WATER READINGS

DATE DEPTH CASING STABILIZATION TIME
 Refer to Table 6.1 for Groundwater Data

DEPTH (FT)	CASING (BPF/ CORING (MIN/FT))	SAMPLE / CORE NO.	SAMPLE DEPTH	BLOWS / 6 INCH	N VALUE	SOIL PEN. / REC. (IN / IN) ROCK PEN / REC. (FT / FT)	TOTAL CORE REC (%)	ROD (%)	Drilling Fluid Loss (Gallons)	SAMPLE DESCRIPTION	FRACTURED ZONE OBSERVED	NOTES	IN SITU PROPERTIES																											
													HARDNESS					WEATHERING					NO. OF FRACTURES PER FOOT																	
													see below for values					see below for values					see below for values																	
													1	2	3	4	5	1	2	3	4	5	1	2	3	4	NUMBER													
61	10									Bedrock																														
62	9												7																											
63	10																																							
64	7																																							
65	11																																							
66	10																																							
67	8																																							
68	9																																							
69	9												12																											
70	8																																							
71	10																																							
72	7																																							
73	12																																							
74	3												13																											
75	5																																							
76	7																																							
77	5																																							
78	5																																							
79	6																																							
80	8																																							
81	6												14																											
82	7																																							
83	6																																							
84	8																																							
85	7																																							
86	6																																							
87	7																																							
88	6																																							
89	7																																							
90	7																																							

GRANULAR SOILS		COHESIVE SOILS		ROCK CORE CHARACTERISTICS		JOINT FRACTURE CHARACTERISTICS				
BPF	DENSITY	BPF	CONSISTENCY	HARDNESS	WEATHERING	NO. PER FT		SPACING/THICKNESS	ANGLE	ATTITUDE
0-4	VERY LOOSE	<2	VERY SOFT	1	VERY SOFT	(1)	0	<2" Very Close/Very Thin	0°-5°	HORIZONTAL
4-10	LOOSE	2-4	SOFT	2	MEDIUM	(2)	1-2	2"-3" Close/Thin	5°-35°	SUB-HORIZONTAL
10-30	MEDIUM DENSE	4-8	M. STIFF	3	MODERATELY HARD	(3)	2-10	3"-10" Mod Close/Mod Thick	35°-55°	MOD DIPPING
30-50	DENSE	8-15	STIFF	4	HARD	(4)	10-20	10"-15" Wide/Thick	55°-85°	SUB-VERTICAL
>50	VERY DENSE	15-30	V. STIFF	5	VERY HARD			>15" Very Wide/Very Thick	85°-90°	VERTICAL
		>30	HARD							

NOTES:
 11. Drilling parameters: 1450 RPM, Roller Bit Pressure 700 psi, 2nd gear between 62 and 69 feet b/g.
 12. Drilling parameters: 1450 RPM, Roller Bit Pressure 800 psi, 2nd gear between 69 and 73 feet b/g.
 13. Drilling parameters: 1450 RPM, Roller Bit Pressure 900 psi, 2nd gear between 73 and 81 feet b/g.
 14. Drilling parameters: 1450 RPM, Roller Bit Pressure 1000 psi, 2nd gear between 81 and 90 feet b/g.

BORING NO. RW-1

BORING LOG

SH. 4 OF 5



BORING NO. RW-1

Reviewed by: M.A. Pontil, Jr. - D. Schipper
PROJECT NO: 41.0017869.10
COORDINATES:
G. SURF. EL. approx 79 feet NORTH: 463006.84
DATUM NGVD 29 EAST: 604879.15
FINAL BORING DEPTH (FT) 140

Table with columns: SAMPLER, SAMPLER HAMMER, CASING SIZE, CASING HAMMER, ROCK CORE, BORING CO., FOREMAN, ENGINEERS, DATE START, DATE END, GROUND WATER READINGS (DATE, DEPTH, CASING, STABILIZATION TIME). Includes note: Refer to Table 6.1 for Groundwater Data

Main data table with columns: DEPTH (FT), CASING (BPF)/CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 6 INCH, N VALUE, SOIL PEN./REG.(IN/IN)/ROCK PEN./REG.(FT/FT), TOTAL CORE REC (%), ROD (%), Drilling Fluid Loss (gallons), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT. Includes 'Bedrock' entry and fracture zones 15 and 16.

Summary table with columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), JOINT FRACTURE CHARACTERISTICS (NO. PER FT, SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
15. Drilling parameters: 1450 RPM, Roller Bit Pressure 1000 psi, 2nd gear between 90 and 120 feet b/g.
16. Approximately 50 gallons of borehole drilling fluid was replaced with clean drilling water at 112 feet b/g.

BORING LOG

SH. 5 OF 5



BORING NO. RW-1

Reviewed by: M.A. Ponti, Jr. - D. Schipper
PROJECT NO.: 41.0017869.10
COORDINATES:
G. SURF. EL. approx 79 feet NORTH: 463006.84
DATUM NGVD 29 EAST: 604879.15
FINAL BORING DEPTH (FT) 140

SAMPLER: Drilling Rig CME L55 Track Rig BORING CO.: ADT
SAMPLER HAMMER: N.A. FOREMAN: Ed Bomer
CASING SIZE: 6-inch diameter (SW) ENGINEERS: Anton Gallas, Sara Covelli
CASING HAMMER: N.A. DATE START: 7/17/06
ROCK CORE: N.A. DATE END: 7/29/06

GROUND WATER READINGS
DATE DEPTH CASING STABILIZATION TIME
Refer to Table 6.1 for Groundwater Data

Table with columns: DEPTH (FT), CASING/BPF/CORING (MIN/FT), SAMPLE / CORE NO., SAMPLE DEPTH, BLOWS / 6 INCH, N VALUE, SOIL PEN. / REC. (IN / IN) / ROCK PEN./REC.(FT/FT), TOTAL CORE REC (%), RQD (%), Drilling Fluid Loss (Gallons), SAMPLE DESCRIPTION, FRACTURED ZONE OBSERVED, NOTES, IN SITU PROPERTIES (HARDNESS, WEATHERING), NO. OF FRACTURES PER FOOT.

Legend table with columns: GRANULAR SOILS, COHESIVE SOILS, ROCK CORE CHARACTERISTICS (HARDNESS, WEATHERING), JOINT FRACTURE CHARACTERISTICS (SPACING/THICKNESS, ANGLE, ATTITUDE).

NOTES:
17. Borehole flushed with clear water at the bottom of the hole to remove cuttings. Six feet of sediment remained at the bottom of the hole after flushing.
18. Borehole left as an open rock well monitoring point. No equipment installed.

BORING NO. RW-1

APPENDIX C

GEOPHYSICAL BOREHOLE LOGS

G E O P H Y S I C A L A P P L I C A T I O N S I N C O R P O R A T E D

June 10, 2006

Mr. David Winslow, PhD, PG
GZA GEOENVIRONMENTAL OF NEW YORK
440 Ninth Avenue
New York, NY 1001

Subject: Draft Borehole Geophysics Logging Report voice: 212-594-8140
 Indian Point Site fax: 212-279-8180
 Buchanan, New York

Dear Mr. Winslow:

This report describes borehole geophysics logging performed by Geophysical Applications, Inc. at the above-noted site. The primary objective of this survey was to help GZA identify hydraulically active fracture depths and orientations encountered by nine uncased bedrock boreholes.

The borehole-logging suite performed at each well included: fluid temperature (FTemp), fluid resistivity (FRes), acoustic televiewer (ABI), and heat-pulse flowmeter testing. The flowmeter testing was performed during both ambient and pumping conditions. Optical televiewer logging and conventional video logging were also performed at selected boreholes.

METHODS OF INVESTIGATION

Survey Control

All borehole logs were referenced to depths below approximate ground surface. The geophysical logging winch contains an optical depth encoder, to maintain depth measurements accurate within approximately ± 0.5 feet throughout a borehole.

Borehole Geophysics Logging

A Mount Sopris model 4MXA or 4MXB logging winch equipped with a Mount Sopris model MGX-II electronics console recorded conventional logs at each well. All conventional log data were recorded at 0.1-foot depth increments, as determined by the logging winch's digital depth encoder.

FTemp and FRes logs were recorded during the first downward logging run at each borehole, using a Mount Sopris caliper probe with a fluid temperature and fluid resistivity subassembly. These fluid logs were obtained using a downward logging speed of approximately 4 to 5 feet per minute. Caliper data were subsequently recorded while pulling the same probe upward at approximately 10 feet per minute.

Acoustic televiewer (ABI) data were obtained using an Advanced Logic Technologies (ALT) model ABI40 acoustic televiewer probe, with the Mount Sopris winch and an ALT model Abox

electronics console. ATV data were recorded at 0.01-foot depth intervals, with 288 pixels for each 360-degree scan around the borehole wall. Logging speeds were approximately 4 feet per minute with this probe.

An optical televiewer log was recorded in wells MW-31 and MW-32 using an ALT model OBI40 probe, also with a Mount Sopris winch and the ALT electronics console. OBI data were stored at depth increments of 0.007 feet, with 360 pixels for each 360-degree scan around the borehole wall. OBI logging speeds were also approximately 4 feet per minute.

A pair of centralizer assemblies positioned the ABI and OBI probes near the middle of each borehole. Each centralizer included four stainless-steel bow springs, clamped to the probe housings with brass compression fittings, at positions recommended by the probe manufacturer to minimize the risk of interference with the probes' internal three-component magnetometers.

Conventional video logs were recorded at MW-30 (formerly designated P-1) and MW-40. These images were obtained using a Laval Cam-Pak 200 borehole video system.

Flowmeter data were recorded with a Mount Sopris model HPF-2293 heat-pulse flowmeter probe, at specific depths selected from field plots of the caliper, FTemp, and FRes logs. Flowmeter data were initially recorded under ambient conditions. The same test depths were subsequently repeated while pumping at 0.4 to 0.75 (gpm) with a Grundfos, Fultz, or Whale pump. The pump was positioned a few feet below the observed static water level in each well. In some cases, the pump was operated so as to maintain the water level some number of feet below the static level (if the well produced little water and the water level was constantly dropping while pumping).

All geophysical log data were recorded on a laptop computer's hard drive, and copied to CD-ROM as a backup precaution.

Post-survey plot scales were adjusted to display as much detail as possible. All conventional logs and flowmeter data were merged onto one plot, to aid data correlation. Televiewer logs are presented on separate pages, at an enlarged scale, for clarity.

Quality Assurance Checks

A variety of checks were performed periodically during the fieldwork, to help assure that the geophysical logging probes were functioning properly:

The caliper probe calibration was checked using two rings of known diameter (3.51 and 10.25 inches).

The ABI probe was visually examined prior to each logging run, to confirm that the mirror's motor was rotating in the proper direction. Following this check, the probe was not turned off until data collection was complete.

The ABI and OBI probes' magnetometers were functionally checked by comparing the azimuths reported by those probes (while stationary, typically on top of a plastic shipping box) with the probe's azimuth as measured by a handheld compass.

Equipment Decontamination Procedures

Decontamination consisted of an Alconox scrub and tap water rinse of the logging cable and probes between logging runs.

SURVEY LIMITATIONS

Measured geophysical-log depths are estimated to be accurate within ± 0.5 feet at this site, allowing for some slippage of the winches' depth-measurement wheels.

The caliper-probe arms can measure borehole diameters up to approximately 16 inches. Caliper logs can most-confidently detect fractures that cross a borehole at moderate angles, e.g. less than approximately 70 degrees from horizontal. Caliper logs may not accurately detect near-vertical fractures.

The heat-pulse flowmeter probe can measure vertical (i.e. upward or downward) water flow rates between 0.02 and approximately 1.2 gallons per minute (gpm). Higher flow rates may be erroneously characterized as zero flow by this probe. This device does not measure horizontal water flow rates or directions.

Hydraulically-active fracture zones were inferred by correlating numerous geophysical logs. These interpretations are a subjective judgment based upon available data.

Acoustic and optical televiwer probes rely on a three-component magnetometer to orient the recorded images with respect to magnetic north. These images become distorted when the magnetometers approach the bottom of steel casing, typically beginning approximately 1 to 2.5 feet below the steel. The upper portion of each unoriented televiwer image was imported into the WellCAD log-plot software and manually rotated to match a distinctive feature below the magnetically distorted interval, to provide usable images throughout the entire water-filled and uncased borehole depth ranges. Dip orientations of televiwer-inferred features within 2.5 feet of a steel casing are therefore approximate.

Calculated down-dip compass azimuths of nearly-horizontal planar features have larger uncertainties than azimuths of steeper-dipping features.

RESULTS

Geophysical log data and generalized log interpretations are described below. Specific interpretations regarding hydraulically-active fracture depths are listed in the "comments" column on the conventional log plots. Most caliper logs show a one- or two-inch diameter range (i.e. 3.5 to 4.5, or 3 to 5, inches in diameter). Horizontal plot scales for the remaining logs were adjusted to show the full range of observed variations at each borehole.

All geophysical logs described in this report are presented in Appendix A, and summary televiwer interpretations are provided in Appendix B. These televiwer-interpretation tables are Excel spreadsheets listing observed planar-feature depths, down-dip compass directions for each inferred planar feature (note that this is perpendicular to the strike direction), feature dip angles with respect to horizontal, and whether an inferred feature was judged to be relatively open or less-open.

Caliper log data are presented in the left conventional log-plot column. Caliper inflections to the right indicate borehole enlargements, for example at casing joints, or where the drill bit passed through a fracture zone.

Fluid temperature (FTemp) and fluid resistivity (FRes) logs are presented in the next conventional-log plot column. Localized inflections or changes in slope of FTemp or FRes logs typically represent water entering or exiting a borehole. Large inflections at the very bottom of a borehole may represent only accumulated sediments with temperature or electrical properties that contrast with the water column.

Heat-pulse flowmeter data are presented on the caliper panel (ambient flow measurements) and on the FTemp/FRes panel (flow measurements while pumping). Shaded boxes to the left of centerline on either panel represent downwards water flow, with the box length indicating the flow magnitude in gpm. Shaded boxes to the right of a panel's centerline represent upwards water flow. Filled circles represent depths where "zero" flow was observed (i.e., flow less than the probe's minimum detectable rate, approximately 0.02 gpm). Flowmeter test depths were selected on-site using field plots of the caliper, fluid temperature, and fluid conductivity logs. Note that the plotted flow magnitudes shown are as reported by the acquisition software. Pumping rates and observed drawdown (from the eight wells where pumping flowmeter tests were performed) are listed in Appendix C, Table 1.

Acoustic televiewer data are presented via two columns (ABI40 "traveltime" and "amplitude"), where each column represents a cylindrical image sliced down the north edge and laid flat on the printed page. Magnetic north is at the left edge of each column, and the plots progress through east, south, west, and back to north at the right-hand edge.

Acoustic televiewer data were evaluated using WellCAD's image-processing module, to measure planar feature dip angles and down-dip azimuths. All down-dip azimuths are referenced to magnetic north. Measured feature orientations are indicated by tadpole plots, where each filled-circle indicates a feature's dip angle from horizontal (plotted on a graph that ranges between zero and 90 degrees from left to right). Each tadpole tail points in the feature's down-dip azimuth, assuming that magnetic north is straight up on the printed page. Note that the down-dip azimuth indicated by each tadpole tail is perpendicular to the feature's strike direction. Also note that the tadpole orientations were corrected for borehole deviation from a vertical orientation.

ABI40 images were also presented in a cylindrical manner, in the column labeled "3D ABI40 image", per GZA's request. In this representation, magnetic north is at the middle of the image, east is towards the left, and west is towards the right.

Optical televiewer data are presented in a single column (labeled "OBI40 image"), showing geologic elements with contrasting color properties. The OBI40 image orientation is comparable to the ABI40 log, with magnetic north at the left edge, progressing through east, south, west, and back to north at the right-hand edge.

Planes represented on both the ABI travel-time and amplitude plots are denoted as "open" features. Features represented only on the ABI amplitude plots are likely to have smaller apertures (or possibly represent bedding, foliation or mineral-filled joints), and are therefore judged relatively "less open". Red tadpoles, and red sine-curve lines superimposed on the ABI plots, represent inferred "open" fractures. Black tadpoles, and black sine curves on the ABI plots, represent interpreted "less-open" features. The tadpoles are also shown on the conventional log plots, to help indicate possible orientations of planar fractures that contributed to groundwater flow observed in each borehole.

Most planar feature orientations were interpreted from the acoustic televiewer logs, because the open or less-open nature of a fracture is more readily evaluated by the ABI data than the OBI40 images (open fractures can be difficult to distinguish based on color alone, particularly when the rock is dark-colored).

Televiewer interpretations are summarized using rose diagrams, to indicate the predominant down-dip azimuth(s) of features observed in a borehole. These rose diagrams are presented with

magnetic north oriented straight up on the printed page. The red rose diagram represents inferred open features, and the black rose diagram represents inferred less-open features (e.g. bedding).

A stereoplot also summarizes the open and less-open feature orientations inferred from the televiewer logs. Each stereoplot was prepared using an equal-angle (Schmidt) projection on the southern hemisphere, with north oriented straight up on the printed page. The pole to a horizontal feature would plot near the diagram's center, whereas a vertical feature's pole would plot at the diagram's outer edge, opposite the feature's down-dip compass direction.

Annotations on the conventional log plot describe interpreted hydraulically-active fracture depths, based on correlations between all of the available log data. Selected observations that may be of particular interest are described below.

MW-30

This well was initially designated P-1, and subsequently re-named MW-30. The static water level was initially near 40.5 feet deep. GZA elected to add water to this well, such that the water level was approximately 31 to 33 feet deep during the FTemp/FRes and "ambient" flowmeter tests. Consequently, the fluid log variations may represent mostly the contrast between natural and added fluids, rather than hydraulically active fractures. GZA added additional water to this well, up to the steel casing, to facilitate acoustic televiewer logging.

The caliper log shows a very smooth bedrock surface in the uncased section. Very distinct FTemp and FRes inflections near 46 feet deep may represent either a transmissive zone, or the interface between water originally in the well versus water added by GZA.

The "ambient" flowmeter measurements, in this well only, represent observations after water had already been added to the borehole. These measurements suggest that ambient downward water flow exited between 41 to 45 feet deep, but this is a very uncertain result.

The black rose diagram shows that most less-open planar features dip down towards the southeast, south-southeast, and northwest. No open feature planes were observed in this borehole.

The stereoplot diagram shows two feature-pole clusters. The larger cluster, in the diagram's upper left quadrant, represents less-open planes that dip down towards the southeast and south-southeast at approximately 30 to 60 degrees from horizontal. The smaller cluster, in the stereoplot's lower right quadrant, represents less-open planes that dip down towards the northwest at approximately 30 to 70 degrees from horizontal.

MW-31

This well's caliper log shows a significant enlargement near the casing bottom (5 to 6 feet deep), and others near 16 and 27 feet deep.

FTemp or FRes inflections judged likely to represent hydraulically active zones were observed near 44.5, 47.5, 56, 60, and 82 feet deep.

Weak ambient downward flow entered less than 40 feet deep, and increased between 46 to 50 feet. Some of this ambient downward flow may have exited at a zone of lower hydraulic head between 50 to 61 feet, and the remainder exited between 80 to 85 feet deep.

Most inflow while pumping entered between 46 to 50 feet deep, probably at a single open fracture that dips down towards the west-northwest at approximately 25 degrees from horizontal. Inflow

while pumping also increased between 40 to 46 feet deep. Pumping this well did not affect the ambient downward flow observed at the 50 through 80-foot test depths.

The black rose diagram shows that interpreted less-open feature planes mostly dip down towards the northwest and southeast. The red rose diagram indicates that interpreted open feature planes exhibited similar down-dip compass azimuths.

The stereoplot diagram shows at least two clusters of feature poles. A loosely grouped cluster located in the diagram's lower right quadrant represents open and less-open planes that dip down towards approximately the northwest, at 20 to 60 degrees from horizontal. A second smaller cluster, located in the diagram's upper left quadrant, represents mostly less-open planes that dip down towards the southeast at approximately 45 to 65 degrees from horizontal.

MW-32

This well's caliper log shows significant enlargements near 9 and 50 feet, and other small enlargements near 22, 55, and 133 feet deep.

Distinct FTemp or FRes inflections judged to represent hydraulically active zones were observed at: possibly 40, 54, 78, 86, possibly 118, possibly 122, possibly 127, 177, and 187 feet deep.

Strong ambient downward flow entered less than 46 feet deep, and increased between 46 to 52, 52 to 60, 75 to 90, 90 to 105, and possibly 115 to 130 feet deep. Downward ambient flow apparently exited at zones of lower hydraulic head between: possibly 105 to 115, 130 to 145, 170 to 180, 180 to 190, and 190 to 195 feet deep.

Pumping this well at a low rate reduced, but did not eliminate, the strong ambient downward flow. All water flow that exited via the pump apparently entered less than 46 feet deep, possibly at the 40-foot distinct FRes and FTemp inflections.

The black rose diagram shows that most interpreted less-open planar features dip down towards the southeast, east-southeast, and south-southeast. Smaller numbers of less-open planes dip down towards approximately the northwest, north-northwest, and west-northwest.

The red rose diagram shows that most interpreted open planes dip down towards the south-southeast and southeast.

The stereoplot diagram shows two very wide clusters of feature poles. The larger cluster is located near the diagram's upper left side, and represents many less-open and open planes that dip down towards the southeast, east-southeast, and south-southeast, mostly at about 35 to 75 degrees from horizontal.

The second wide cluster of feature poles, located near the diagram's lower right side, represents less-open planes that dip down towards the northwest, north-northwest, and west-northwest, mostly at 30 to 80 degrees from horizontal.

MW-34

This borehole's caliper log shows small enlargements near 6, 10 to 11, and 15 to 16 feet deep.

Fluid log anomalies judged to possibly represent hydraulically active zones were observed near 16 feet, and possibly 10 feet deep. The noisy appearing fluid logs were probably caused by transducers that were removed from this well by GZA immediately prior to logging.

Very weak upward ambient flow entered between 13 to 18 feet, and exited less than 13 feet deep.

Very weak inflow while pumping may have entered between 24 to 28 feet, and increased between 13 to 18 feet deep.

Most interpreted less-open feature planes (black rose diagram) dip down towards the southeast, northeast, and approximately northwest.

The red rose diagram shows that the interpreted open feature planes may dip down in four azimuths: southeast, northeast, east-southeast, and north-northwest.

The stereoplot appears to show at least one cluster of feature poles, near the diagram's upper left edge. This cluster represents open and less-open planes that dip down towards the southeast, at approximately 65 degrees from horizontal.

MW-35

This well was relatively shallow, and contained some diesel fuel that was apparently floating on the water surface. The caliper log shows no significant enlargements throughout the uncased depth range.

FTemp and/or FRes inflections judged to possibly represent hydraulically active zones were noted near 13.5, 15, 18 to 20, possibly 22, and possibly 26 or 27.5 feet deep.

Flowmeter observations in this well were not as repeatable as generally seen at other wells logged during this survey. This may be due to a pump that is operating nearby, thereby causing water flow through the well at unknown rates and times.

Upward ambient flow may have entered between 13 to 18 feet deep, and exited at a zone of lower hydraulic head less than 13 feet deep (possibly near the static water level).

Inflow while pumping may have originated between 24 to 28 feet deep, and increased between 13 to 28 feet.

The black rose diagram shows that most interpreted less-open feature planes dip down towards the south, south-southwest, and southeast. The red rose plot shows that the single interpreted open feature plane dips down towards the east-northeast.

The stereoplot diagram shows a small cluster of black feature poles above the diagram's center, representing less-open planes that dip down towards the south and south-southwest at approximately 40 to 60 degrees from horizontal.

MW-39

The caliper log for this borehole shows a substantial enlargement immediately below the casing bottom (approximately 24 to 25 feet deep), and small enlargements near 69 and 104 feet.

FTemp and/or FRes inflections judged to possibly represent hydraulically active zones were observed at the following depths: 63, 68 to 69, 84 to 87, 95, 100, 116, 121, and 143 feet.

Ambient upward flow entered between 90 to 98 feet deep, and increased between 80 to 90 feet. This upward ambient flow exited at a zone of lower hydraulic head between 60 to 72 feet deep (probably at the 69-foot deep caliper enlargement and corresponding FTemp and FRes inflections).

Ambient downward flow entered between 98 to 110 feet deep, possibly near the subtle fluid log inflections near 100 feet). Some of this downward ambient flow exited at a zone of lower head between 110 to 128 feet, and the remainder exited between 140 to 155 feet deep.

Note that pumping this well at a low rate did not eliminate the downward flow observed during ambient conditions at 110 feet deep. Upward flow while pumping originated between 98 to 110 feet, and increased at each of the shallower flowmeter test depths.

The black rose diagram shows that most less-open planar features dip down towards approximately the southeast. Smaller numbers of less-open planes also dip down towards the east-southeast, east, south-southeast, and south-southwest.

Relatively few open planar features were observed in this well. The most common down-dip orientations of this small population of open planes were towards approximately the northwest and northeast.

The stereoplot diagram shows one large cluster of feature poles, on the diagram's upper left side. These poles represent mostly less-open planes that dip down towards the southeast, east-southeast, and south-southeast, primarily between 40 to 80 degrees from horizontal.

MW-40

This well's caliper log shows numerous enlargements, particularly between the casing bottom and 21 feet deep. Loose rock apparently fell from at least one of these zones during the initial logging attempt, trapping a flowmeter probe for several days. After GZA's driller assisted with removing the lodged probe, the well was reamed and subsequently logged without further difficulties.

FRes and/or FTemp inflections judged likely to represent hydraulically active zones were observed at the following depths: 20.5, 26, 31, 33.5, 39, 40, 43 to 44, 48, 55, 59, 62, 65, 67, 74 to 75, and 82 to 83 feet deep.

Strong ambient downward inflow entered between 18 to 22 feet deep, and increased between 22 to 25, 25 to 30, and 30 to 40 feet deep. Some of this ambient downward flow may have exited between 40 to 60 feet deep, but most exited at a zone of lower hydraulic head between 80 to 110 feet deep (probably at the FTemp and FRes inflections, and open planar features near 83 feet).

Pumping this well at approximately 0.5 gpm reduced, but did not eliminate, the strong ambient downward flow. All water flow that exited via the pump apparently entered the borehole less than 22 feet deep (probably at the 16 and/or 20.5-foot deep caliper enlargements).

The black rose diagram shows that most interpreted less-open planar features dip down towards due north, north-northwest, and north-northeast. Small populations of less-open features also dip down towards the east-southeast and west-northwest.

The red rose diagram shows that open planar features exhibited a wide range of down-dip azimuths. A small number of open feature planes apparently dip down towards approximately the southeast.

The stereoplot diagram shows two primary groups of feature poles. The largest group is located at the bottom of the stereoplot, representing mostly less-open planes that dip down towards due north, north-northwest, and north-northeast at approximately 30 to 75 degrees from horizontal. A much smaller cluster of poles, located near the plot's upper left side, represents mostly less-open planes that dip down towards the southeast at 50 to 70 degrees from horizontal.

MW-51

This borehole's caliper log shows only two minor diameter increases, near the casing bottom (21 feet) and also at 26 feet deep.

The most distinct fluid log inflections judged to represent hydraulically active features were observed near 113 feet deep, coincident with an open planar feature that dips gently almost due east. Other subtle FTemp and FRes inflections that may represent hydraulically active zones were inferred at 32, 34 to 40, 43, 49, 52, possibly 88 to 90, and possibly 123 feet deep.

Strong ambient downward flow entered less than 31 feet deep, near the static water level. Ambient downward flow was observed to increase at numerous depth ranges, including: 31 to 40, 40 to 47, and 55 to 70 feet deep. Some of this ambient downward flow exited at zones of lower hydraulic head between 70 to 85 and 85 to 100 feet deep; the remainder exited between 100 to 114 feet deep (probably at the 113-foot FTemp and FRes inflections noted above).

Additional weak ambient downward flow was observed entering between 114 to 130 feet deep, and exiting between 159 to 176 feet deep, and greater than 190 feet.

The black rose diagram shows that most less-open feature planes dip down towards the west-northwest to northwest, and southeast.

The small number of open planar features represented by the red rose plot dip down towards the west-southwest, east-southeast, and southeast.

The stereoplot diagram shows two primary clusters of feature poles. The largest cluster is located below and right of the diagram's center, representing mostly less-open planes that dip down towards the west, west-northwest, and northwest, mostly at about 20 to 70 degrees from horizontal. A smaller cluster of feature poles, plotted near the diagram's upper left side, represents less-open planes that dip down towards approximately the southeast, mostly at 50 to 70 degrees from horizontal.

MW-52

This well's caliper log shows relatively little variation. Two minor enlargements are visible near 15 and 124 feet deep.

GZA removed the following apparatus from this well, immediately prior to geophysics logging: a pressure transducer, a sampling pump, and ancillary tubing and wires. Pulling these items through the water column resulted in some mixing of the borehole fluid properties, therefore inferred hydraulically active depths based on the fluid logs are less confident compared to most other wells logged at this site. FRes and FTemp variations judged to possibly represent hydraulically active zones were interpreted at the following depths: 20 to 27, 44, 47, 53, 59, 62, 64, 77, 101, 104, 115, and 135 to 139 feet.

Ambient flowmeter tests showed weak downward flow entering at numerous locations, possibly including 18 to 22, 43 to 56, 70 to 83, 95 to 110, 110 to 126, 155 to 171, and 171 to 182 feet deep. Most ambient downward flow exited at a zone of lower hydraulic head greater than 182 feet deep. Weak ambient downward flow may have exited at numerous depths including: 22 to 30, 56 to 70, 83 to 95, and possibly 140 to 155 feet.

Pumping this well quickly dropped the water level by several feet. Consequently, the pump was operated as needed to maintain the water level 3.1 feet below the static level. This "pumping" condition eliminated most of the downward flow observed during ambient conditions. Weak upward flow while "pumping" entered between 140 to 155, 56 to 70, 43 to 56, and 18 to 30 feet deep.

The black rose diagram shows that most interpreted less-open planar features dip down towards the east-southeast and east. Smaller populations of less-open planes dip down towards the south-southeast, north to north-northwest, and west-northwest.

The red rose diagram shows that the few interpreted open planar features mostly dip down towards the east-southeast, east-northeast, and southeast.

The stereoplot diagram shows a wide range of plotted pole orientations. The largest cluster of feature poles is located left of the diagram's center, representing mostly less-open planar features that dip down towards the east-southeast, east, and east-northeast at 40 to 75 degrees from horizontal. Additional (but smaller) clusters of feature poles appear to represent the following down-dip orientations: a) down towards the north and north-northwest at 40 to 60 degrees from horizontal, b) down towards the west-northwest at 40 to 50 degrees from horizontal, and down towards the south-southeast at both 30 to 40 and 60 to 80 degrees from horizontal.

* * * * *

We appreciate this opportunity to provide geophysical services. Please call the undersigned at 508/429-2430 if we may provide additional information that would benefit GZA's project.

Sincerely,

GEOPHYSICAL APPLICATIONS, INC.

Mark E. Blackey
Principal and Geophysicist

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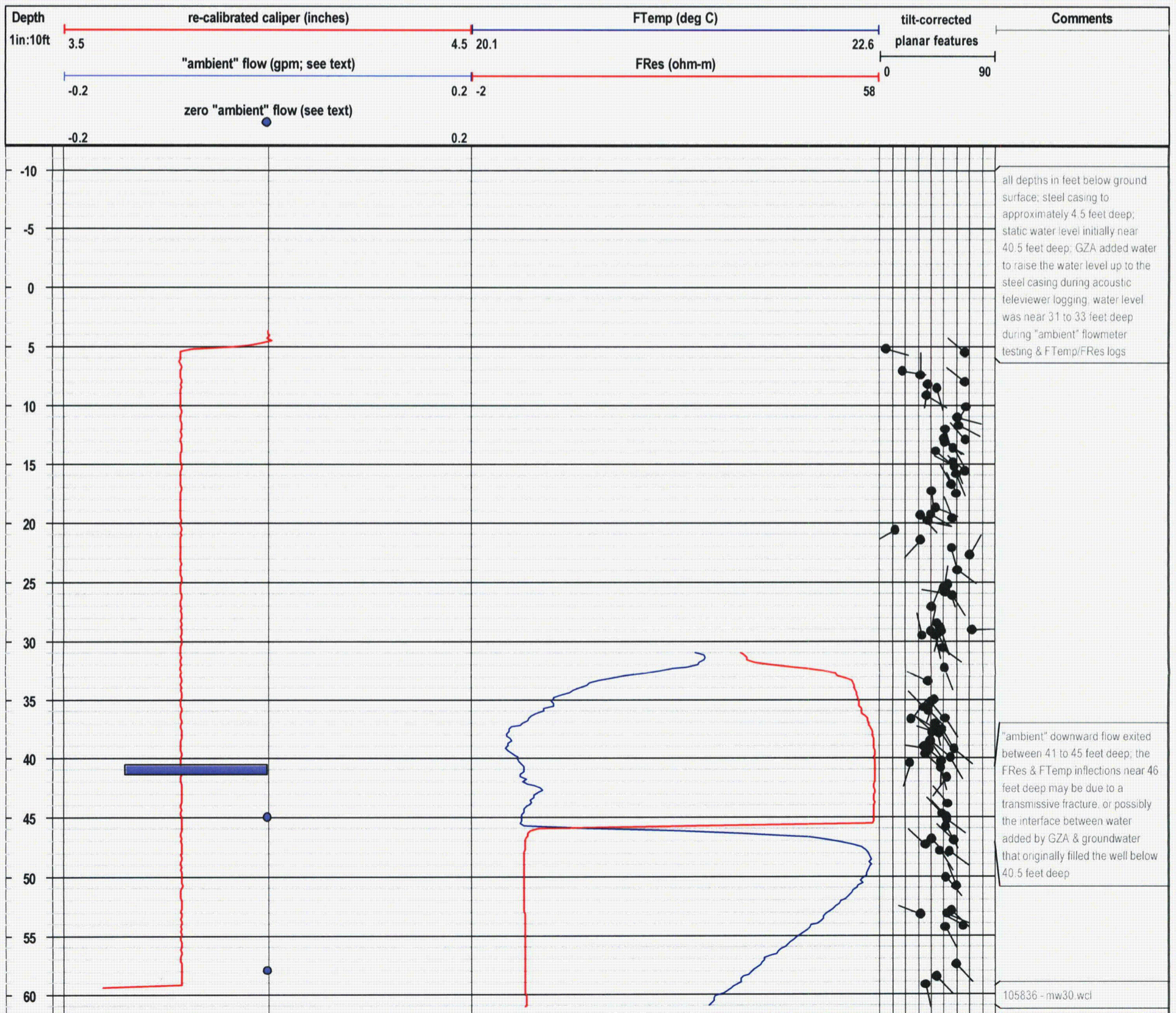
Draft Borehole Geophysics Logging Report
Indian Point Site
Buchanan, New York

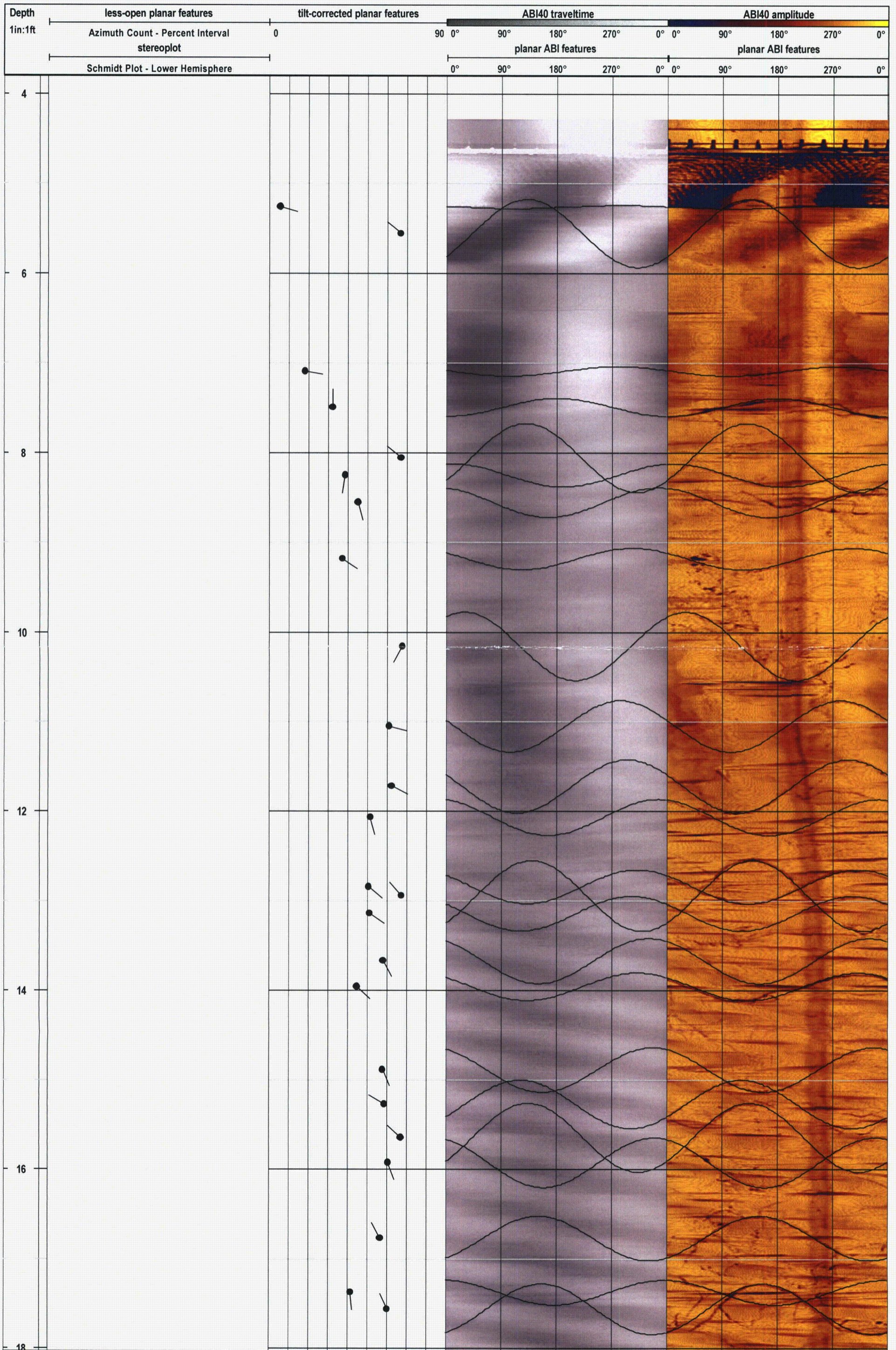
Prepared for
GZA GEOENVIRONMENTAL OF NEW YORK
June 2006

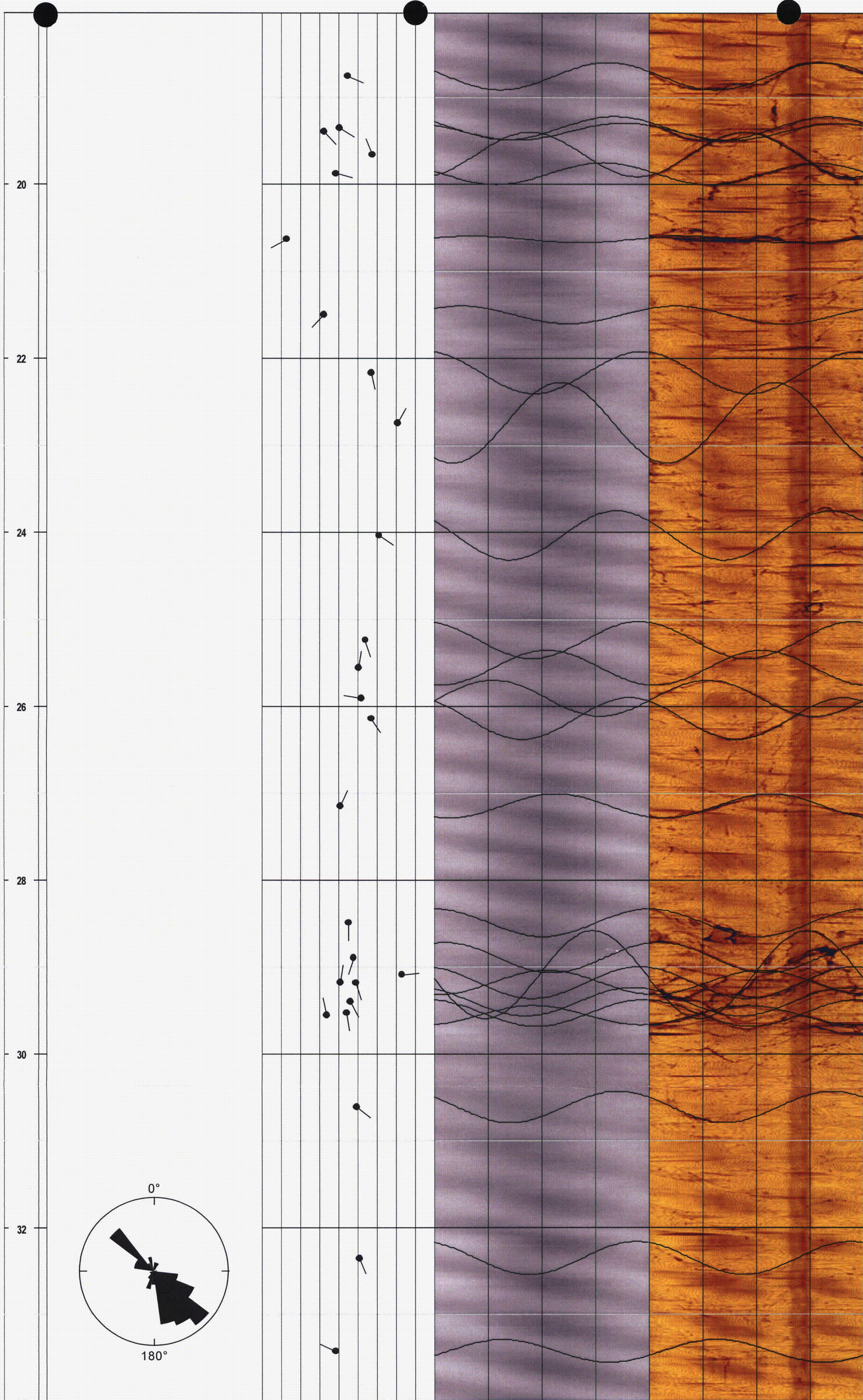
Appendix A

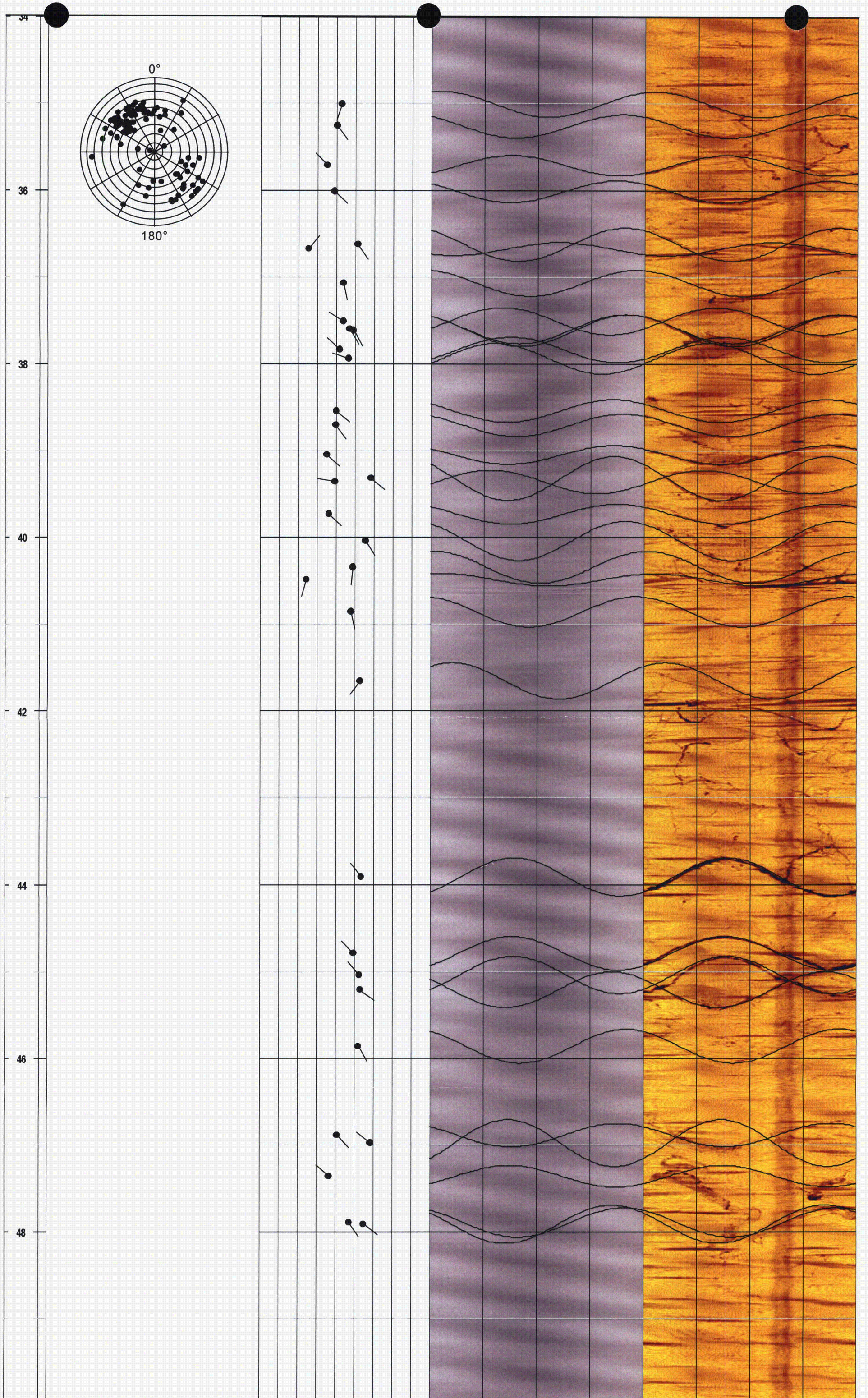
Borehole Geophysics Log Plots

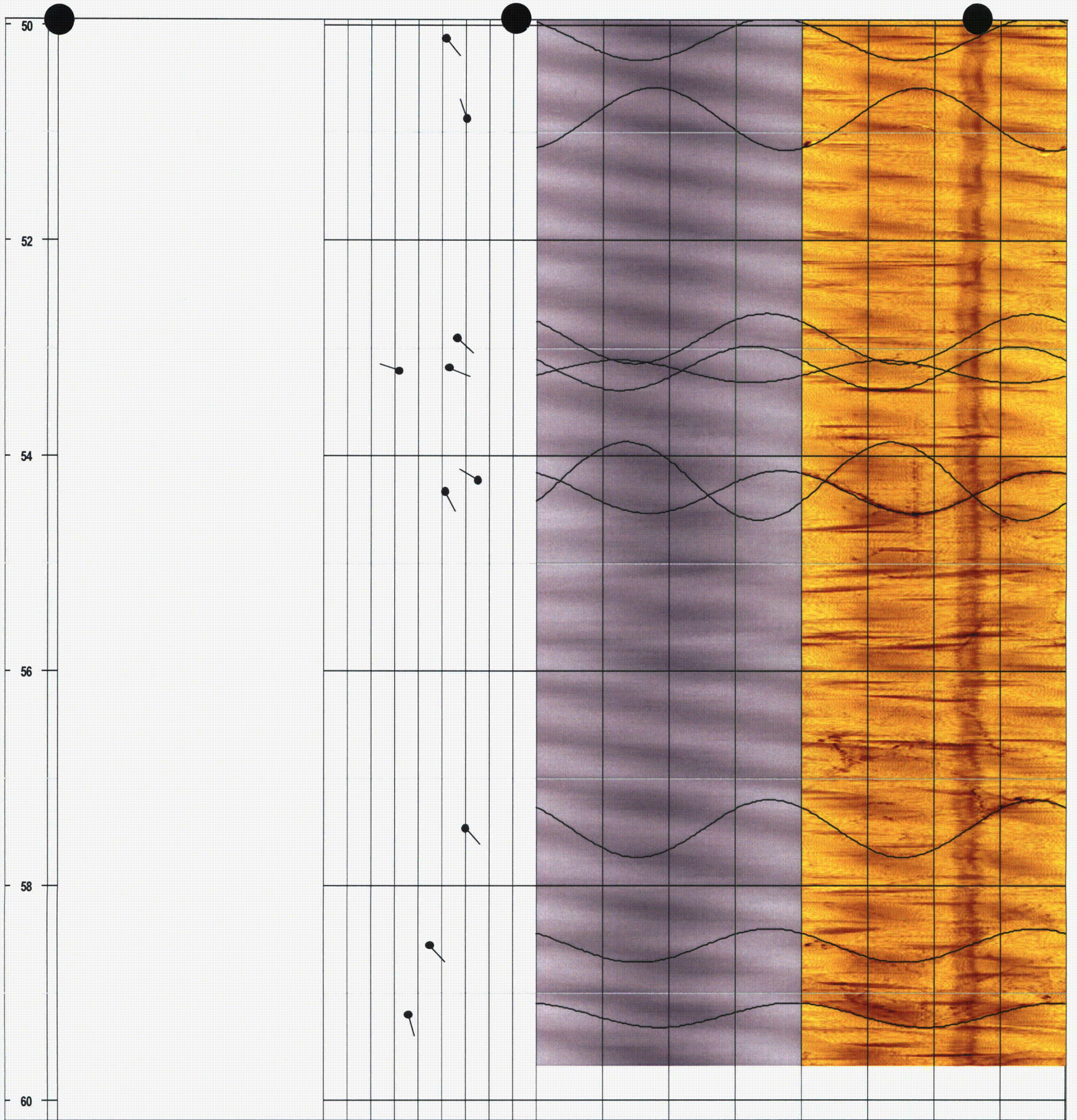
Project - Well: GZA / Buchanan, NY - MW-30 (former P-1) conventional logs



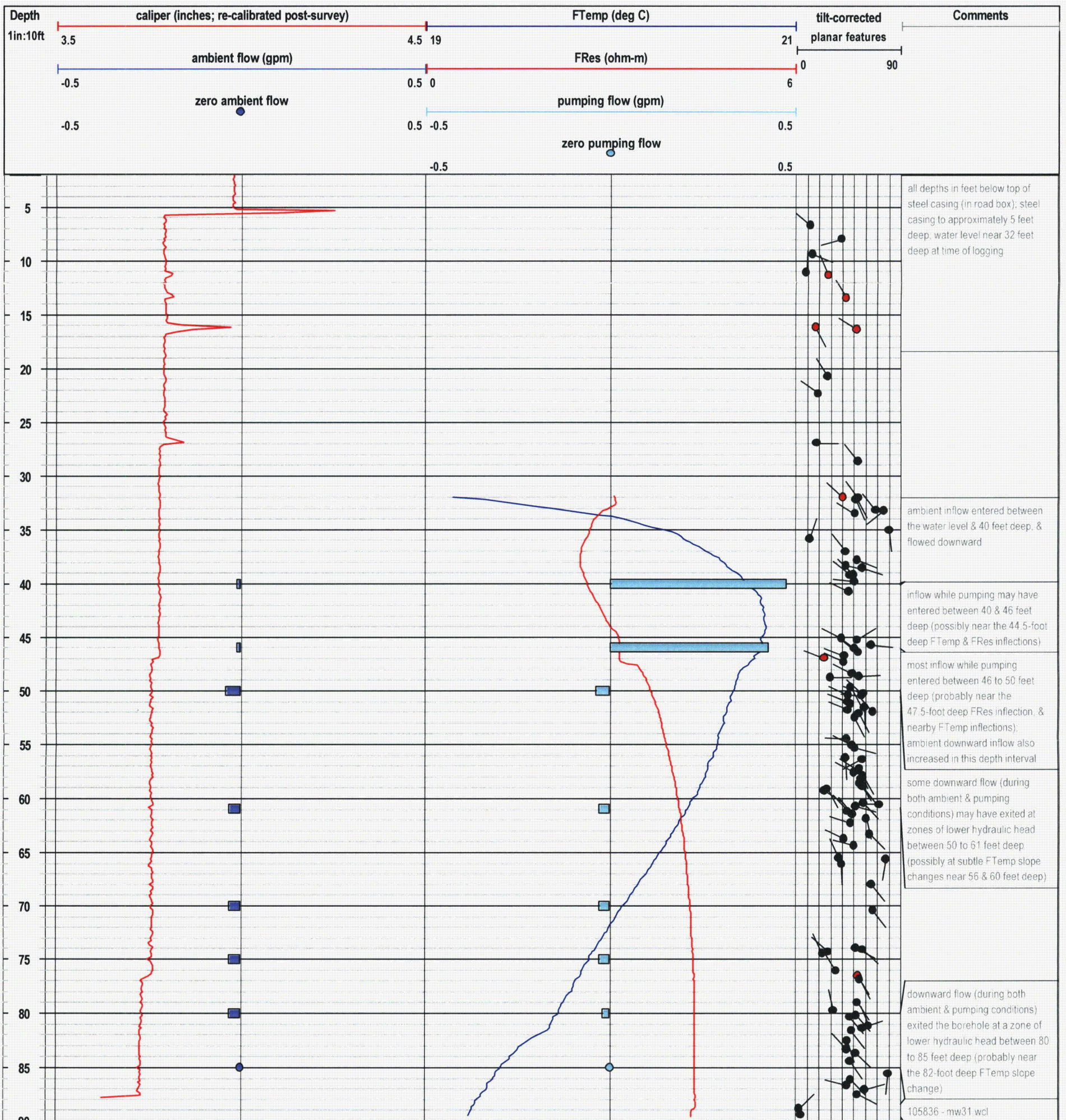








Project - Well: GZA / Buchanan, NY - MW-31 conventional logs



Project - Well: GZA / Buchanan, NY - MW-31 optical & acoustic televiewer logs

