Nine Mile Point 3 Nuclear Power Plant

Combined License Application

Part 11F: Boring Logs B101 to B215

Revision 0
September, 2008

Graphic Legend:

Surficial Deposits	Oswego Transition Zone
Fill	Pulaski Formation
Glacial Till	Whetstone Gulf Formation
Oswego Sandstone	Marker Bed

Rock Field Hardness:

A measure of resistance to scratching or abrasion.

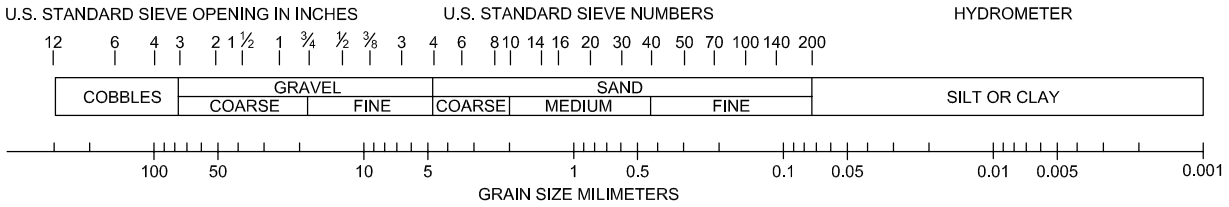
Hard	Scratches with point of steel blade with difficulty.
Medium	Scratches readily with point of steel blade.
Soft	Grooves readily with point of steel blade.

Rock Weathering:

The action of the elements in altering the color, texture, and composition of the rock.

Fresh	Crystals bright, some slight staining of joints.
Slight	Rock generally fresh, joints stained.
Moderate	Joints stained, discoloration extends 1-inch into rock.
Severe	Rock discolored, rock strength reduced to strong soil.

Soil Grain Size Scale:



Nine Mile Point Unit 3 Site Characterization Oswego, New York	GEI Consultants	FINAL BORING LOG LEGEND
AREVA NP Marlborough, Massachusetts	Project 07223	Rev. 1, July 2008

Final Boring Log

Boring No.
B101(MW)

Boring Information

Northing : 1282173.9 **Easting :** 543489
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 265.3
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich D-50 / BL1

Date Start - End: 8/14/2007 - 8/21/2007
Driller Name: Wes Imhoff
Logged By : Shawn Mixan
Drilling Company : Boart Longyear
Total Depth (ft) : 255.0

Drilling Information

Hammer Ident: SN II
Auger I.D: 4.25 inch
Auger Head Length: 6 inch

Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.5 ft

Drilling Method: 4.25-inch-ID HSA (soil), 4-inch-ID/4.5-inch-OD casing advanced to top of rock.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	6/18	1-2-7	NA				S1: SILTY SAND (SM) ~65% fine sand, ~25% non-plastic fines, ~10% gravel with max. size of 1", Light Brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 3 ft (El. 262.3 ft).
260			S2	11/18	7-14-13	NA	Hard Drilling from 5.5 to 6 feet			S2: SANDY SILT (ML) 54% non-plastic fines, 45% mostly fine to medium sand, 1% fine gravel, light brown. (Laboratory grain-size analysis performed.) GLACIAL TILL.
	10		S3	0/3	50/3"	NA	Hard Drilling from 9.5 to 10.0 feet			S3: No Recovery
			C1	26/54	NA	5/3.5 ft				C1: SILTY SAND WITH GRAVEL (SM) ~40% fine sand, ~35% fine to coarse gravel with the maximum size of 1.5", 25% non plastic fines, gray-brown. GLACIAL TILL
250			S4	3/4	50/4"	NA				S4: SILTY SAND WITH GRAVEL (SM) ~50% fine sand, 35% slightly plastic fines,15% fine to coarse gravel with a maximum size of 1", gray. GLACIAL TILL
										S5: SILTY SAND WITH GRAVEL (SM) Similar to S4. GLACIAL TILL.
	20		S5	1/3	50/3"	NA				Approximate top of Oswego Sandstone at depth 22.5 ft (El. 242.8 ft).
			C2	27/30	27	2 2 1	Fresh, bedding-parallel fractures along siltstone laminations			C2: SANDSTONE, minor shale interbeds, greenish gray to dark gray, medium hardness, massive, fine-grained, well-sorted, fresh weathering, smooth, horizontal fractures typically spaced 2-8" apart.
240			C3	120/120	81	1 1 1 1 2 1 2 1 1				C3: SANDSTONE, greenish gray, medium hardness, generally massive, fine-grained, well-sorted, fresh, smooth, horizontal fractures typically 6-16" apart, vertical fractures from 33.1-34.2 ft. Minor interbedded shale laminations, trace of shale clasts, faint bedding and cross-bedded planes.
	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Final Boring Log

Boring No.
B101(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures / Graphic Log	Soil-Sample Description Rock-Lithological Description
						2			
230			C4	120/120	89	1	Vertical fracture in sandstone, pyrite on fracture surface		C4: SANDSTONE, greenish gray, medium, generally massive to thinly bedded with minor cross-bedding, fine-grained, well-sorted, fresh, smooth, slightly weathered, horizontal fractures, minor interbedded silty shale. Becomes dark greenish gray at ~41 ft as rock becomes more argillaceous.
						1			
						1			
						1			
						1	Thin shale interbeds.		
						1	Cross-bedding.		
	40					1			
						1			
						1	Closely-spaced fractures in shale.		
						1			
						1			
							Slight weathering.		
220			C5	114/120	95	1			C5: SANDSTONE, dark greenish gray, medium, generally massive bedding, fine-grained, well-sorted, fresh, smooth, slightly weathered, horizontal fractures. Sandstone interbedded with silty shale (45.5-45.7 ft and 47.5-48.2 ft).
						1			
						1.5			
						1			
						1			
	50					1			
						1.5			
						1.5			
						1	Cross bedding.		
						1	Fractures along boundaries of siltstone and sandstone lenses.		
210			C6	120/120	85	2			C6: SANDSTONE, greenish gray to dark greenish gray, hard, generally massive with minor thin bedding, fine-grained, well-sorted, fresh, smooth, slightly weathered, horizontal fractures. 62.7-63.7 ft: thin, interbedded layers of clasts of silty shale, argillaceous sandstone.
						2			
						2			
						3			
						2			
	60					3			
						3			
						2			Approximate Top of Oswego Transition Zone at depth 62.5 ft (El. 202.8 ft).
						3			
						2			
200			C7	120/120	80	2	Thin interbedded layers of siltstone.		C7: ALTERNATING LAYERS OF SANDSTONE AND ARGILLACEOUS SANDSTONE, greenish gray to gray, finely laminated to medium bedded, fine-grained, well-sorted, fresh to slightly weathered, smooth, planar fractures oriented within 10° of horizontal, interbedded laminated to thinly bedded silty shale in argillaceous sandstone. 70.4-70.8 ft: argillaceous clasts in sandstone matrix.
						2			
						1			
						2			
						2			
	70					1			
						2			
						1			C8: ARGILLACEOUS SANDSTONE, greenish gray to gray, medium, thinly bedded with minor silty shale laminations and stringers, bedding planes are somewhat uneven and irregular with argillaceous clasts and fossils, minor interbedded siliceous sandstone. Smooth, slightly weathered horizontal fractures spaced 4-16" apart.
						2			
						2			
190			C8	120/120	78	2	Disrupted bedding (soft sediment deformation).		

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Boring No.
B101(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1 2 2 1 2 2 2 1 2	Fossilferous.			Approximate top of Pulaski Formation - Unit A at depth 85 ft (El. 180.3 ft).
180	80		C9	119/120	88	NM	12-inch thick shale layer (marker bed). Vertical fractures in sandstone, slightly weathered.			C9: ARGILLACEOUS SANDSTONE, gray, medium, fine-grained, well-sorted, slightly weathered, fossiliferous. Horizontal fractures with moderate weathering, 1"-thick severely weathered shale layer at 88.8 ft. Argillaceous sandstone interbedded with siliceous sandstone, thin to medium bioturbated bedding with thin laminations of silty shale. Fracturing is smooth, moderately weathered and spaced 4-18" apart.
170	90		C10	119/120	90	NM	Inclined fracture along moderately-dipping bedding plane. Disturbed bedding (soft sediment deformation).			C10: INTERBEDDED ARGILLACEOUS SANDSTONE AND SANDSTONE, gray to dark gray, medium hard, mostly fine-grained, well-sorted, moderately weathered, fossiliferous. Argillaceous sandstone is thinly to moderately bedded with finely laminated silty shale, sandstone is finely bedded. Generally horizontal fracturing spaced 4-16" apart, fracturing is smooth and planar with moderate weathering.
160	100		C11	120/120	91	2 2 3 2 3 3 2 3 3 3	Vertical fracture in sandstone - calcite on fracture surface			C11: ARGILLACEOUS SANDSTONE, gray to dark gray, medium hardness, thinly to moderately bedded with interbedded silty shale laminations. Mostly fine-grained, well-sorted, slightly weathered, smooth, horizontal fractures spaced 4-30" apart, fossiliferous. Approximate top of Pulaski Formation - Unit B at depth 115 ft (El. 150.3 ft).
150	110		C12	119/120	96	NM				C12: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILICEOUS SANDSTONE, greenish gray to gray, hard to medium, bedded with silty shale laminations, uneven bedding, fine-grained, well-sorted, smooth, fresh to slightly weathered horizontal fractures. C12: (Cont.)

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
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NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 265
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Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Boring No.
B101(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
	120						Vertical fracture in sandstone, iron oxide staining on fracture surface with calcite infilling.	(117-121.5 ft) Siliceous sandstone interbedded with minor argillaceous sandstone, greenish gray, hard, thinly bedded, fine to medium grained, well-sorted, unfractured fossils. Vertical fracture at 119.6-121.1 ft with calcite infill. (121.5-125 ft) Argillaceous sandstone interbedded with silty shale and siltstone layers.
140			C13	116/120	66	NM		Approximate top of Pulaski Formation - Unit C at depth 127.5 ft (El. 137.8 ft).
	130						Fractures along siltstone and sandstone contacts, slickensides on siltstone fractures, fresh to slightly weathered.	C13: SILICEOUS SANDSTONE, greenish gray to gray, hard, thinly bedded, interbedded with argillaceous sandstone, shale, and siltstone, fine to medium grained, well-sorted, generally smooth, slightly weathered, horizontal fractures, shale layers becoming thicker and more common in C12 and C13, fossiliferous.
130			C14	120/120	88	NM	Siltstone clasts.	C14: SHALE AND SILTSTONE, black, medium, laminated, interbedded with thick (up to 14") layers of siliceous sandstone, slightly weathered, horizontal fractures typically spaced 4-10" apart, thin bedding within shale and siltstone. Sandstone - gray, hard, thinly bedded, minor cross-bedding, medium-grained, well-sorted, generally unfractured.
	140						Horizontal, bedding-parallel fractures in siltstone.	
120			C15	120/120	83	3 2 2 3 2 2 3 2 3 2		C15: (145-148.6 ft) SILTSTONE, dark gray, medium, laminated, interbedded with minor shale and sandstone, generally unfractured, slightly weathered. (148.6-150.7 ft) SANDSTONE, light gray,hard, thinly bedded, medium-grained, well-sorted, unfractured, fresh. (150.7-152.7 ft) SHALE, black, medium, laminated, slightly weathered, smooth, slightly weathered horizontal fractures typically spaced at 3-8", interbedded with siltstone and sandstone, fossiliferous. (152.7-155 ft) Interbedded sandstone and siltstone, fossils.
	150							
110			C16	120/120	86	2 3 3 2 3 2 2 3 2	C16: INTERBEDDED LAYERS OF SILICEOUS SANDSTONE, SILTSTONE AND SHALE, gray to black, medium to hard, laminated to finely bedded, slightly to moderately weathered, smooth, slightly weathered, horizontal fractures typically 3-18" apart, fossiliferous. Vertical fracture with calcite infill at 158-158.3 ft.
	160						Moderately-dipping inclined fracture along siltstone and sandstone contacts. Vertical fracture with calcite on fracture surfaces.	

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Boring No.
B101(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2				
100			C17	120/120	84	2 2 2 3 2 1 2 2 2 2	Near vertical fracture with calcite coating on fracture surfaces.			C17: (165-170 ft) INTERBEDDED LAYERS OF SILTSTONE, SHALE AND SANDSTONE, gray to black, hard to medium, laminated to thickly bedded, slightly weathered, smooth, slightly weathered horizontal fractures typically spaced 6-16" apart. Fossil layers at 166.5-166.8 ft and 167.7-168.2 ft. (170-172.5 ft) SANDSTONE, gray, hard, bedded, medium grained, well-sorted, fresh, unfractured, interbedded with black, laminated shale.
	170									
90			C18	115/120	93	2 2 2 3 2 2 3 2 2 3	Fresh, unfractured. Siltstone fractures along bedding planes.			C18: (175-179 ft) SANDSTONE, gray, hard, bedded, medium grained, well-sorted, fresh, generally unfractured. (179-185 ft) SILTY SHALE, gray to black, medium, laminated, slightly weathered, smooth, slightly weathered horizontal fractures typically spaced at 6-18", interbedded with sandstone. Approximate top of Whetstone Gulf Formation - Unit A at depth 182 ft (El. 83.3 ft).
	180									
80			C19	120/120	80	2 2 3 2 2 2 3 2 2 2	Calcite on sandstone fracture surfaces. Near-vertical fracture.			C19: (185-192.5 ft) SHALE, dark gray to black, medium, laminated, interbedded with siltstone, slightly weathered, smooth, slightly weathered horizontal fractures typically spaced at 2-6" apart, fossiliferous. (192.5-195 ft) SANDSTONE, gray, hard, massive, interbedded with shale at 193.7-193.9 ft and 194.6-195 ft, slightly weathered, generally unfractured, fossiliferous.
	190									
70			C20	120/120	73	3 4 3 5 4 3 2 3 4 3	Fresh.			C20: SILTSTONE, gray to black, medium, laminated, interbedded with sandstone and shale, thick sandstone layer (195.9-197.1 ft), fresh to slightly weathered, smooth, slightly weathered fractures ranging from horizontal to ~20°, fractures typically spaced 3-10" apart, fossiliferous.
	200									
60						2				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

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Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Boring No.
B101(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C21	117/120	93	3 2 2 3 2 2 3 2 3	Moderately-dipping inclined fracture with dip-slip slickensides near contact of siltstone and sandstone.			C21: SILTSTONE, dark gray to black, medium, interbedded with shale laminations, slightly weathered, smooth, slightly weathered near horizontal fractures typically spaced 8-24" apart, fossiliferous, fissile. Sandstone (207.4-211.8): gray, hard, massive, medium-grained, well-sorted, unfractured.
210										
50			C22	120/120	93	3 2 2 3 3 3 2 2 2 2	Near-vertical fracture in sandstone. Near-horizontal bedding-parallel fractures in siltstone.			C22: SANDSTONE, gray, hard, thinly bedded, medium-grained, well-sorted, fresh, generally unfractured. (218.4-220.7 ft) SHALE: dark gray, medium, laminated with siltstone, slightly weathered, smooth, slightly weathered, near horizontal fractures typically spaced 3-6" apart, very fossiliferous, calcareous clast.
220										
40			C23	120/120	81	2 2 2 2 2 2 2 3 3 3				C23: INTERBEDDED SHALE AND SILTSTONE, dark gray to black, medium, laminated to thinly bedded, slightly weathered, smooth, slightly weathered near horizontal fractures typically spaced 3-10" apart, interbedded with 3 thick (~8") layers of sandstone.
230										
30			C24	113/120	86	2 2 2 2 3 3 3 2 3 2				C24: SHALE, dark gray to black, medium, laminated with minor siltstone, slightly weathered, smooth, slightly weathered near horizontal fractures typically spaced 6-12" apart, interbedded with sandstone layers up to 6" thick, minor fossils.
240										
20			C25	120/120	90	3 2 2 2				C25: SANDSTONE gray, hard, laminated to thinly bedded, medium grained, well-sorted, slightly weathered, interbedded with silty shale, sandstone exhibits laminated to thinly bedded layers of silty shale.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
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Final Boring Log

Boring No.
B101(MW)

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 255.0

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	250					2 2 2 3 3 3				
10										Bottom of boring at depth 255 ft (El. 10.3 ft). Groundwater Monitoring well installed upon completion (screen interval: 119.8 ft to 130.3 ft). See separate Groundwater Well Installation Log for details.
	260						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
0										
	270						Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds.			
-10							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted.			
	280						Fracture surfaces are generally unweathered unless otherwise noted.			
-20										
	290									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.2 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log Signature Page	Boring No. B101(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmid Date: 4/8/08

Rock Descriptions Checked by: Neil L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

H. Shields performed a software functionality check: Input from software database equals output on Final Log.

A. Cummings ~~performed check~~ AC 4/18/08 verified locations of fractures.

Form 150.3 rev. 1

Final Boring Log

Boring No. **B102(MW)**

Boring Information

Northing : 1281119.1 **Easting :** 542988.4
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 255.6
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 8/14/2007 - 8/21/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 245.6

Drilling Information

Hammer Ident: SN III
Auger I.D: 4.25 inch
Auger Head Length: 3.25 inch

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: 4.25-inch HSA to 15.6 ft, cored rock from 15.6 ft to 245.6 ft using NQ2 wireline core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	16/24	5-8-11-13	NA				S1: SANDY SILT WITH GRAVEL (ML); ~60% slightly plastic fines, ~20% fine to coarse sand, ~20% fine to coarse gravel (0.5 in max). Trace root fibers, light brown. SURFICIAL DEPOSITS.
										Approximate top of Glacial Till at depth 3.5 ft (El. 252.1 ft)
250			S2	3/11	15-100/5	NA				S2: SANDY SILT (ML); Similar to S1, except no gravel. GLACIAL TILL.
			S3	3/6	100/6	NA				S3: ROCK FRAGMENTS; Fragments appear to be Oswego Sandstone. GLACIAL TILL.
	10		S4	21/24	19-48-28-20	NA				S4: (0-13"): SANDY SILT (ML); 53% fines (LL = 15, PI = 3), 39% mostly fine to coarse sand, 8% fine gravel. Light gray. (Laboratory grain-size and Atterberg limit tests performed.) (13-24"): CLAYEY GRAVEL (GC); ~50% fine to coarse gravel, ~50% low plasticity fines. Many gravel pieces where fractured by sampler. Light gray, sample was very dry. GLACIAL TILL. S5: SANDY LEAN CLAY WITH GRAVEL (CL); ~60% low plasticity fines, ~20% fine sand, ~20% fine gravel. Light gray, sample was very dry. GLACIAL TILL.
240			S5	7/7	16-100/181	NA				Approximate top of Oswego Sandstone at depth 15.6 ft (El. 240.0 ft).
			C1	59/60		1 1.5 2 4 N.M	Cross-bedding.			C1: SANDSTONE, medium, fresh, horizontal joints spaced 4-24", light gray.
	20		C2	61/60	100	2.5 Avg.	Horizontal bedding plane fractures along siltstone laminations and contacts with sandstone.			C2: SANDSTONE, medium, fresh, horizontal joints spaced 6-12", light gray, some trace fossils.
230			C3	118/120	94	2.5 2.5 2 2 2.5 2 2 2				C3: SANDSTONE, medium, fresh, horizontal joints spaced 3-36", light gray, some trace fossils.
	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 245.6

Boring No.
B102(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 2.5				
220			C4	8/10	80	NM				C4: SANDSTONE, similar to C3.
			C5	112/110	91	2 2 2.5 2 2 2 2 2 2 2.5				C5: SANDSTONE, similar to C3.
	40									
210			C6	118/120	63	3 2.5 2.5 2.5 2.5 2.5 3 2.5 4 3	Clay infilling in weathered siltstone/shale - severe weathering, possible fault gouge material. Clasts of siltstone within sandstone. Calcite on vertical fracture.			C6: SANDSTONE, light gray with some black interbedded shale (in lower 36"), medium, horizontal fractures spaced 4-18". Approximate top of Oswego Transition Zone at depth 50 ft (El. 205.6 ft).
	50									
200			C7	118/120	32	2.5 4 2.5 2.5 2.5 2 2 2.5 2.5 2.5	Cross-bedding. Lenses of siltstone within sandstone.			C7: SANDSTONE (0-33") Light gray, finely bedded sandstone, medium, fresh. (33-78") Light brownish gray, mottled sandstone with some siltstone clasts, medium - soft, fresh argillaceous sandstone. Noticeable color difference from 0-33". (78-118") Light gray/black sandstone with alternating beds of siltstone, some trace fossils. Horizontal fractures throughout core, spaced 2-4". Approximate top of Pulaski Formation - Unit A at depth 62.5 ft (El. 193.1 ft).
	60									
190			C8	119/120	61	2.5 2.5 2.5 2 2 2.5 3 3 3 3	6-inch-thick shale layer (marker bed). Bedding-parallel fractures. Siltstone clasts in sandstone.			C8: SANDSTONE, light gray sandstone, medium, bedded - laminated, well-sorted, fresh, horizontal fractures spaced 2-12", fossils are visible.
	70									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

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Boring No.
B102(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
180			C9	118/120	70	3.5, 3, 3, 3, 2, 2, 2.5, 2.5, 3, 3	Fossiliferous - well-lithified fossil debris. Clay infilling in 1"-thick bed with rock fragments - severe weathering, possible fault gouge material.			C9: SANDSTONE, light gray, medium, bedded layers of light gray sandstone, freshly weathered, horizontal fractures spaced 1-12". At 14" and 82" layers of gray clay with rock fragments. Some fossils visible.
	80									
170			C10	122/120	80	2, 3, 4, 3, 2, 2, 2, 2, 3, 2.5	Bedding-parallel fractures.			C10: SANDSTONE, light gray, medium, bedded layers, horizontal fractures spaced 2-14", freshly weathered. Similar to C9 except more marine fossils (fossils react with HCl).
	90									
160			C11	116/120	75	3, 4, 3, 4, 2, 2.5, 2, 2.5, 2.5, 3.4	1"-thick green mineral bed (marker bed). Thin pyrite beneath green mineral bed.			C11: ARGILLACEOUS SANDSTONE, light gray, medium, laminated layers, some layers are disturbed, horizontal fractures spaced 1-12", fresh. Some layers of dark gray medium siltstone are visible. At approx. 103 ft a thin, green mineral layer was encountered.
	100									Approximate top of Pulaski Formation - Unit B at depth 104.5 ft (El. 151.1 ft).
150			C12	120/120	86	2.5, 3.5, 2, 3, 4, 2, 2, 1.5, 2, 3	Disturbed bedding (soft sediment deformation). Clasts and lenses of siltstone.			C12: ARGILLACEOUS SANDSTONE, light gray, soft with occasional areas of medium hardness, laminated bedding, fresh rock, horizontal joints spaced 1-12", some fossils.
	110									C13: SILTSTONE, mostly dark gray with some beds of light gray sandstone, medium-soft hardness, medium to fine well-sorted grains, fresh rock, horizontal fractures spaced 3-12", several bands of disturbed bedding are present.
140			C13	121/120	88	1.5, 2				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
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Natural gas observations recorded on Well Level Measurement Form 162.1.

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GEI Project Number: 07223

GEI Consultants

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B102(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 3 3.5 2 2 2.5 2 2	Fossiliferous - well-lithified fossil debris.			
130	120		C14	116/120	50	3 2.5 1.5 2.5 5 4 3 5 5 3.5	High angle fracture with calcite infilling. Siltstone lenses in sandstone. Closely spaced bedding-parallel fractures in siltstone. More widely spaced fractures in sandstone.			C14: SANDSTONE AND SHALE, Dark gray, soft shale layers alternating with light gray, medium sandstone. Shale is highly fractured (horizontal fractures spaced 0.5-3" in shale), horizontal fractures in sandstone spaced 2-6", fresh rock.
120	130		C15	125/120	61	2 2.5 5 2.5 4.5 4 3.5 3.5 4 3.5	Thin clay layers from weathered shale - possible fault gouge material. Moderately dipping fracture. Sandstone lenses in siltstone. Disrupted bedding (soft sediment deformation).			C15: SHALE WITH INTERBEDDED SANDSTONE, dark gray, soft shale with interbedded layers of light gray, medium sandstone. Shale is fissile, dark gray, soft, fresh. Sandstone is light gray, medium, fresh. Horizontal fractures spaced 0.5-8", shale layers have many fractures. Approximate top of Pulaski Formation - Unit C at depth 140 ft (El. 115.6 ft).
110	140		C16	120/120	81	2.5 2 2 2 3 3 3.5 2 3 3	Well-lithified fossil debris in sandstone. Possible fault gouge material - 2 thin clay layers (<1") from weathered shale. Moderately dipping fracture.			C16: SHALE WITH SANDSTONE, dark gray shale with interbedded light gray sandstone. Horizontal fractures spaced 2-14". Similar to C15, except less fracturing.
100	150		C17	118/120	82	3.5 2 2 2.5 4	Pyrite on fracture surface.			C17: SANDSTONE AND SHALE, light gray, medium sandstone with interbedded layers of dark gray, soft shale. 0.5"-thick layers of of gray clay encountered at 42" and 46" from top of core, horizontal fractures spaced 1-15", fossils at 101" react with HCl.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

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Boring No.
B102(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4 3.5 2.5 4.5 3.5	Siltstone clasts in sandstone.			
90			C18	120/120	83	2 4 3 3 4 4 5 5 5 5	Vertical fracture.			C18: SANDSTONE (0-63") Soft, dark gray shale interbedded with medium, light gray sandstone. (63-114") Medium, light gray sandstone, laminated bedding. (114-120") Similar to 0-63". Fresh rock, horizontal fractures spaced 2-18". Approximate top of Whetstone Gulf Formation - Unit A at depth 172.5 ft (El. 83.1 ft).
	170									
80			C19	35/35	86	3 2.5 3				C19: SANDSTONE, light gray, medium sandstone. 0.5"-thick layer of gray clay encountered at 178.3 ft.
	180		C20	81/85	61	3 3 2.5 3 2 2.5 2	Gray clay - 0.5"-thick weathered shale layer. Possible fault gouge material. Moderately dipping fracture.			C20: SHALE, fresh rock, dark gray, black, soft, laminated fissile shale. Light gray, medium sandstone from 75-85".
70			C21	116/120	83	3 2 2 2.5 3 2 2 3 2.5 3				C21: SANDSTONE WITH SHALE, medium, light gray sandstone with interbedded dark gray, soft shale. Layer of medium/hard, light gray sandstone from 0-4.5" from top of core. Laminated beds, horizontal fractures spaced 2-18", fresh rock.
	190									
60			C22	121/120	93	2 2 1.5 2.5 2 2 2 2	Well-lithified fossil debris.			C22: SHALE WITH SANDSTONE, dark gray, soft shale with a few layers (~3" thick, 18" apart) of light gray, hard sandstone. Fresh rock, horizontal fractures spaced 2-20".
	200									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

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Total Depth (ft) : 245.6

Boring No.
B102(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures / Graphic Log	Soil-Sample Description Rock-Lithological Description
						2.5			
						2			
50							Near-vertical fracture in sandstone.		
			C23	122/120	82	2			C23: SANDSTONE, light gray, medium - hard, laminated sandstone with some silty shale. Fresh rock, mostly horizontal fractures spaced 2-24", 2 inclined fractures near top of core (10° and 45°)
						2			
						2			
						2.5			
						3			
	210					2.5			
						2			
						2.5			
						2			
						2.5			
40							Well-lithified fossil debris.		
			C24	116/120	88	3			C24: SANDSTONE WITH SILTY SHALE, alternating layers of light gray, hard, thickly bedded sandstone and dark gray, medium silty shale. Fossils at 12-20.5", 45° fracture near base of core.
						3			
						3			
						3.5			
						2.5			
	220					2.5	Close fracture spacing in siltstone intervals.		
						3			
						2			
						2			
						2.5			
30									
			C25	119/120	80	3	30° fractures.		
						2.5			
						3			C25: SILTY SHALE, dark gray, soft silty shale with a few layers of medium, light gray sandstone. Fresh rock, mostly horizontal fractures spaced 0.5-12", inclined fractures are typically 30° from horizontal, zones of high fracturing at 9-12" and 21-26".
						3			
						4			
	230					2.5			
						3	Siltstone lenses in sandstone.		
						3			Approximate top of Whetstone Gulf Formation - Unit B at depth 232.5 ft (El. 23.1 ft).
						3			
						3			
20							Fewer fractures in dominantly sandstone intervals.		
			C26	112/120	88	3			C26: SILTY SHALE WITH SANDSTONE, dark gray, soft, silty shale interbedded with light gray, medium sandstone. Fresh rock, horizontal joints spaced 1-35". Very few fractures, core is predominately sandstone.
						2			
						2			
						2			
						2.5			
	240					1.5			
						2.5			
						2.5			
						2.5			
						3			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/21/2007
Total Depth (ft) : 245.6

Boring No.
B102(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
10										Bottom of boring at depth 245.6 ft (El. 10.0 ft). Groundwater Monitoring well installed upon completion (screen interval: 106 ft to 124 ft). See separate Groundwater Well Installation Log for details.
	250						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
0							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	260						Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
-10							Rock is hard, fresh, and unweathered unless otherwise noted.			
	270						Fracture surfaces are generally unweathered unless otherwise noted.			
-20										
	280									
-30										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded on Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B102(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Katie P. Shutes Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schaub Date: 4/8/08

Rock Descriptions Checked by: Phil A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. King Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B103(MW)
Page 1 of 1

Boring Information

Northing : 1281133.2 **Easting :** 542986.1
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 255.9
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 8/21/2007 - 8/22/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 63.6

Drilling Information

Hammer Ident: NA
Auger I.D: NM
Auger Head Length: NM

Casing I.D: 5 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

Drilling Method: Advanced casing to top of rock, drilled to 63.6 ft with 3.875 inch air hammer.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
250										Boring advanced to 61.0 ft without sampling.
	10									
240										
	20									
230										
	30									
220										
	40									
210										
	50									
200										
	60									
190										Bottom of boring at depth 63.6 ft (El. 192.4 ft). Groundwater Monitoring well installed upon completion (screen interval: 48.6 ft to 63.6 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B103(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Walter P. Smith Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schaub Date: 4/8/08

Rock Descriptions Checked by: Neil L. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B104(MW)

Boring Information

Northing : 1281396.9 **Easting :** 543483.1
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 255.9
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich / BL2

Date Start - End: 8/14/2007 - 8/20/2007
Driller Name: Paul Dickensen
Logged By : C. Conti, K. Skinner
Drilling Company : Boart Longyear
Total Depth (ft) : 203.5

Drilling Information

Hammer Ident: SN I
Auger I.D: 4.25 inch
Auger Head Length: 6 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 0-6.5 ft HSA, 6.5 ft-19 ft drive and wash with 4-inch casing, 19 ft-203.5 ft wireline coring (NQ2).

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
		X	S1	10/18	11-9-10	NA				S1: SILTY SAND WITH GRAVEL (SM); ~60% mostly fine sand, ~25% non-plastic fines, ~15% coarse to fine gravel to 1.25" subrounded and angular. Medium brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 2.5 ft (El. 253.4 ft).
250		X	S2	12/18	22-14-16	NA	Boulder at 6.5 ft.			S2: SILTY SAND (SM); ~65% mostly fine sand, ~25% non-plastic fines, ~10% coarse to fine gravel to 0.75". Medium brown. GLACIAL TILL.
	10	X	S3	13/24	14-16-13-10	NA				S3: (0-3.5") ROCK FRAGMENTS. Fragments of Oswego Sandstone. (3.5-13"): SILTY SAND WITH GRAVEL (SM); 48% fine to coarse sand, 30% non-plastic fines, 22% fine to coarse gravel, gray. (Laboratory grain-size analysis performed.) GLACIAL TILL.
240		X	S4	1/24	10-15-16-15	NA				S4: Fragments of Oswego Sandstone with some gravel to 0.25". GLACIAL TILL. Approximate top of Oswego Sandstone at depth 17.5 ft (El. 238.4 ft).
	20		C1	45/54	68	1.7 1.7 4 4	Horizontal bedding-parallel fractures along siltstone laminations.			C1: SANDSTONE, gray-green, thinly bedded, fine, well-sorted, subangular, slightly weathered, planar fractures ~horizontal, highly fractured zone at 2.9-3.1 ft.
230			C2	60/60	74	4 4 4 4 4				C2: Similar to C1 with shaley layer at 9-13", fractures spaced 2-40". C3: Similar to C1 with 0.5" shale interval at 81". Fossiliferous below 81" to bottom of core.
	30		C3	94/120	98	4 4 4 4 4				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 256
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Boring No.
B104(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4				
						4				
						4				
						4				
220						4	Siltstone clasts in sandstone.			
			C4	64/120	97	4	Fossiliferous.			C4: Similar to C1, top 7" fossiliferous, segments of thinly bedded finer material, fractures spaced 11-24".
	40					4				
						4				
						4				
						4				
						4				
						4	Cross bedding.			
						4	Siltstone lenses and clasts in sandstone.			
210						4				
										Approximate top of Oswego Transition Zone at depth 50 ft (El. 205.9 ft).
			C5	74/48	80	3				
	50					3				
						3				
						3				C5: Similar to C1, 65° fracture at 31", highly fractured zone at 46.5-48.5".
			C6	74/12	42	4	60° fracture.			C6: SANDSTONE, gray-green with bands of dark gray, thinly bedded - some areas of lamination, mostly planar fractures horizontal to ~35°, one irregular fracture at 5.5", well-sorted, some trace fossils, fresh.
			C7	106/120	76	5				
						5				
200						5				
						5				C7: Similar to C6, 26-28" zone of fine siltstone layers. At 71.5-85.5" zone of planar and irregular fractures probably due to driller re-drilling section during core run. Fractures are 0.25-3" apart. 71.5-85.5" siltier and softer.
						5				
						5				
						5				
	60					5				
						5				
						5				
										Approximate top of Pulaski Formation - Unit A at depth 60.5 ft (El. 195.4 ft).
			C8	98/120	84	3				
						3				
190						3				C8: INTERBEDDED SANDSTONE AND SILTSTONE, predominantly gray-green sandstone with mottled dark gray siltstone layers, fine-grained, thinly bedded to laminated, planar to slightly irregular fractures horizontal to 15°, shaley layer at 39-40".
						3				
						3				
						3				
	70					3				
						3				
						3	Bedding-parallel fractures in siltstone and argillaceous sandstone.			
			C9	83/60	87	3				C9: Similar to C8, layers of shell material at 73-74", fractures spaced 2-9.5".
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

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B104(MW)

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180						3				
						3				
						3				
			C10	116/120	47	4	Layer of well-lithified fossil shell debris.			C10: Similar to C8, fossiliferous layer 75-85", fractures spaced 1-25", planar to irregular, horizontal to 10°.
	80					4				
						4				
						4				
						4				
						4				
						4				
						4				
170						4				
						4				
							Fossiliferous - shell debris.			
			C11	123/120	93	4				C11: INTERBEDDED SILTSTONE, SANDSTONE AND SHALE, predominantly siltstone, fine-grained, well-sorted, fine-bedding to lamination, planar fractures spaced 0.5-36", horizontal.
	90					4				
						4				
						4				
						4				
						4				
						4				
						4				
						4				
160						4				
			C12	119/120	94	3				C12: INTERBEDDED SANDSTONE, SILTSTONE AND SHALE, mostly graywacke and siltstone, light gray to dark gray, hard to soft, bedding is thin. Grains are fine, well-sorted, subrounded. Fractures are 2-14" apart, mostly horizontal (one is 20° at 63"), fracture surfaces are smooth and have slight undulations. Most surfaces are clean, some have silt present, possibly from drilling, there are layers of mottling in the siltstone - possibly shell fragments.
	100					3				
						3				
						3				
						3				
						3				
						3				
						3				
						3				
150						3				
			C13	121/120	91	4				C13: Similar to C12, most fractures are planar with one 20° fracture at 60" and one 30° fracture at 121".
	110					4				
						4				
						4				
						4				
						4	Lenses and clasts of siltstone in sandstone.			
						4				
						4				
140						4				Approximate top of Pulaski Formation - Unit B at depth 116.5 ft (El. 139.4 ft).

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/20/2007
Total Depth (ft) : 203.5

Boring No.
B104(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Well-lithified fossil shell debris.			
			C14	117/120	79	4 3 4 4 4 4 4 4 4 4	Bedding-parallel fractures in siltstone. Increasingly thick beds of sandstone.			C14: Similar to C12, 30° fracture at 39.5, 25° at 44", 10° at 50", 30° at 94.5", irregular fracture at 108.5". 15" sandstone layer at 79.5", 6.5" sandstone layer at 110.5", bands of sandstone/gray wacke/siltstone are becoming longer and more distinct starting at 56".
	120									
	130									
			C15	60/60	67	4 4 4 3 4				C15: Similar to C12. 14.5" sandstone layer at top of core.
	130									
			C16	121/120	93	4 4 4 4 4 4 4 4 4 4	Vertical fracture in sandstone with calcite on fracture surface.			C16: Similar to C12, 13" band of sandstone at 5.5" with vertical fracture (contains calcite). Mottled layer (23") starting at 37.5". Approximate top of Pulaski Formation - Unit C at depth 137.5 ft (El. 118.4 ft).
	120									
	140						Lenses of sandstone in siltstone.			
			C17	110/120	91	4 4 4 4 3 4 4 4 4 4				C17: SILTSTONE AND SANDSTONE, dark gray siltstone and sandstone with interbedded shale. 24" segment of sandstone at 24", sandstone layers range from 2-24", bottom 8" contains calcareous shell material, planar fractures spaced 1-24".
	110									
	150									
			C18	113/120	89	4 4 6 6 4 4 4 4	Clasts and lenses of siltstone in sandstone.			C18: INTERBEDDED SANDSTONE AND SILTSTONE WITH SHALE, light gray sandstone with siltstone and dark gray shale layers. Sandstone and siltstone beds are ~6" or less, fractures planar and spaced 1-14".
	100									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/20/2007
Total Depth (ft) : 203.5

Boring No.
B104(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4 4				
			C19	121/120	93	4 4 4 4 4 4 4 4 4 4	Well-lithified fossil debris in sandstone. Striations on fracture surface - slickensides.			C19: SANDSTONE WITH INTERBEDDED SHALE AND SILTSTONE, 34" sandstone layer at 49-84", planar fractures spaced 1-36", shell material at 16-19".
90										
	170									Approximate top of Whetstone Gulf Formation - Unit A at depth 173 ft (El. 82.9 ft).
			C20	124/120	91	4 4 6 4 4 4 4 4 4 4	Vertical fracture. Bedding-parallel fractures. Vertical fracture.			C20: SILTSTONE WITH INTERBEDDED SHALE AND SANDSTONE, predominantly siltstone, top 10" fine sandstone followed by ~82" of siltstone with thin shale layers less than 1". Fractures planar and horizontal. Vertical fractures at 85" and 116", both ~4" long.
80										
	180									
			C21	121/120	91	4 4 4 4 4 6 4 4 4 4	Well-lithified fossil debris layers.			C21: SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, shale layers 0.5-3", planar fractures horizontal to 15°, fine bedding-laminated silt and shale. Some mottling at silt/shale, sandstone/shale contacts, fractures spaced 0.5-31".
70										
	190									
			C22	120/120	88	4 4 4 4 4 4 4 4 NM NM	Sandstone lenses in siltstone.			C22: Similar to C21, fractures spaced 1-16", planar, horizontal to 10°.
60										
	200									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/14/2007 - 8/20/2007
Total Depth (ft) : 203.5

Boring No.
B104(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
										Bottom of boring at depth 203.5 ft (El. 52.4 ft). Groundwater Monitoring well installed upon completion (screen interval: 178 ft to 198 ft). See separate Groundwater Well Installation Log for details.
50										
							General Comments about Core Samples:			
	210						Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
40							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	220						Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
30							Rock is hard, fresh, and unweathered unless otherwise noted.			
	230						Fracture surfaces are generally unweathered unless otherwise noted.			
20										
	240									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Artesian Conditions.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B104(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Walter P. Shutak Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Mark L. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Terry Date: 4/8/08

Notes:

A. Cummings verified locations of fractures

Form 150.3 rev. 1

Final Boring Log

Boring No.
B105(MW)
Page 1 of 1

Boring Information

Northing : 1281404.3 **Easting :** 543488.9
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 255.9
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich / BL2

Date Start - End: 8/21/2007 - 8/22/2007
Driller Name: Paul Dickensen
Logged By : Chad Conti
Drilling Company : Boart Longyear
Total Depth (ft) : 61.0

Drilling Information

Hammer Ident: NA
Auger I.D: NM
Auger Head Length: NM

Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

Drilling Method: Rotary wash with 4-inch casing to 17.5 ft. Drilled bedrock from 17.5 ft to 61 ft with 3.875-inch air hammer.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
250										Boring advanced to 61 ft without sampling.
	10									
240										
	20									
230										
	30									
220										
	40									
210										
	50									
200										
	60									
190										Bottom of boring at depth 61 ft (El. 194.9 ft). Groundwater Monitoring well installed upon completion (screen interval: 43 ft to 58 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B105(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Hugh A. Potts Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B106(MW)**

Boring Information

Northing : 1282272.9 **Easting :** 544173.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich / BL2

Date Start - End: 8/21/2007 - 8/30/2007
Driller Name: Paul Dickensen
Logged By : Chad Conti
Drilling Company : Boart Longyear
Total Depth (ft) : 195.0

Drilling Information

Hammer Ident: SN I
Auger I.D: 4.25 inch
Auger Head Length: 6 inch
Drilling Method: 0-10.5 ft HSA, replace HSA with casing, 10.5 ft-195 ft coring (NQ2).

Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	19/24	3-5-5-5	NA				S1: SILTY SAND (SM); ~65% sand, ~25% fines, ~10% fine gravel; non-plastic fines. Brown with streaks of light brown and yellow. SURFICIAL DEPOSITS.
250			S2	24/24	1-3-4-5	NA				S2: (0-8") SILTY SAND (SM); ~65% sand, ~25% low plasticity fines, ~10% fine gravel. Brown with areas of rust colored oxidation. (8-24") SANDY LEAN CLAY (CL) 60% fines (LL = 23, PI = 11), 31% mostly fine to medium sand, 9% fine gravel, gray with light brown, dark brown and reddish brown streaks. (Laboratory grain-size and Atterberg limit tests performed.) SURFICIAL DEPOSITS. Approximate top of Oswego Sandstone at depth 8 ft (El. 248.0 ft).
	10		C1	46/54	60	3 3 3 3 3	Horizontal bedding-parallel fractures along siltstone beds.			C1: SANDSTONE WITH INTERBEDDED SILTSTONE, siltstone layers up to 3", fine-grained, planar fractures generally horizontal, some small cross-bedding in sandstone, fractures spaced 0.5-13", highly fractures zone of siltstone at 26-29.5".
240	20		C2	119/120	91	3 3 3 3 3 3 3 3 3 3	Crossbedding.			C2: SANDSTONE WITH INTERBEDDED SILTSTONE, predominantly sandstone with 5" layer of siltstone at 65" and uneven patches of siltstone throughout. Planar fractures spaced 1"-26", fine-grained, gray-green, hard sandstone, soft siltstone.
230	30		C3	121/120	98	3 3 3 4 3 3 3 3 3 3				C3: SANDSTONE WITH INTERBEDDED SILTSTONE, fractured zone of siltstone at 52-54", mottled segment 14-18", sandstone is gray-green, siltstone is gray. Planar fractures horizontal, 13-18" - zone of mottling (siltstone in sandstone).

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 195.0

Boring No.
B106(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
220			C4	120/120	97	3 3 3 3 3 4 3 3 3 NM	Siltstone lenses in sandstone.			C4: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, planar fractures, some mottling at sandstone/siltstone contacts, sandstone is hard to medium (in areas of higher silt content), siltstone is soft. Gray-green, fine-grained sandstone; gray to dark gray siltstone, massive bedding in sandstone, fine lamination in siltstone.
	40									
210			C5	118/120	93	3 3 3 3 3 3 3 3 3 3				C5: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, mottling in top 10", core becomes predominantly siltstone and graywacke at 55" with mottling and possible storm event layers. 2 low angle fractures (~20° at 85"). Bottom 60" becomes siltstone with some shale. Approximate top of Oswego Transition Zone at depth 55 ft (El. 201.0 ft).
	50									
200			C6	120/120	98	3 3 3 3 3 3 3 3 3 3	12-inch-thick shale layer. Cross-bedding.			C6: SILTSTONE WITH GRAYWACKE AND INTERBEDDED SHALE, top 5" silty shale bed. Possible marker bed. Hard to medium sandstones and graywackes, soft siltstone and shale, planar fractures spaced 3-24" and occurring at shale layers.
	60									
190			C7	121/120	95	3 3 3 3 3 4 4 4 4 4				C7: INTERBEDDED SANDSTONE, SHALE AND SILTSTONE, very disturbed layering with mottling and fossil layer of shell material/trace fossils. Thick sandstone bed at 97-113", otherwise all beds generally interbedded and <2". Sandstone is medium to hard, siltstone and shale are soft. Horizontal - low-angle planar fractures. Approximate top of Pulaski Formation - Unit A at depth 71 ft (El. 185.0 ft).
	70									
180			C8	119/120	96	3 3 4 3	Bedding-parallel fractures.			C8: INTERBEDDED SANDSTONE AND SILTSTONE WITH SHALE (0-64") Mottling and trace fossils, predominantly siltstone. (64-119") Predominantly sandstone with siltstone and shale interbedded. Fractures planar and generally horizontal.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 195.0

Boring No.
B106(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	80					3 4 4 3 3 3	Well-lithified fossil shell debris.			
170	90		C9	119/120	95	4 4 4 3 4 4 4 3 3 3				C9: Similar to C8. Fewer fossiliferous beds, interbedded sandstone, siltstone and shale throughout. Planar fractures, generally horizontal.
160	100		C10	121/120	99	3 3 3 3 4 4 3 3 3 3	Mottled appearance due to clasts of siltstone and sandstone.			C10: ALTERNATING BEDS OF SANDSTONE AND SILTSTONE/SHALE, well-defined layers with mottling throughout, layers range from 2-12" thick, some fossils present, planar, horizontal fractures. Approximate top of Pulaski Formation - Unit B at depth 102.5 ft (El. 153.5 ft).
150	110		C11	121/120	96	3 3 3 3 3 3 3 3 3 3	Bedding-parallel fractures along siltstone and sandstone contacts. Quartz vug.			C11: Similar to C10, sandstone becomes predominantly at ~96", planar fractures horizontal, some trace fossils, mottling. Quartz vug at 45", may contain small amount of calcite.
140	120		C12	121/120	81	3 3 2 2 3 3 3 3 3	Laminated bedding in siltstone. Fractured intervals in shale, 2-3 inches thick. Sandstone clasts in siltstone.			C12: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE from 0-61", siltstone with interbedded shale and sandstone from 61-121", planar fractures generally horizontal, highly fractured zones of shale at 9-11", 40-42", 73-74", 99-101". Approximate top of Pulaski Formation - Unit C at depth 119.5 ft (El. 136.5 ft).

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 195.0

Boring No.
B106(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3				
130			C13	110/120	82	3 3 3 3 3 3 4 4 4 3	Natural gas pocket at 130 ft. Drill water bubbling at the top of the casing, measured gas levels over 10% LEL			C13: SILTSTONE AND SHALE WITH INTERBEDDED SANDSTONE, 20" sandstone bed at 69", planar fractures generally horizontal. One vertical fracture at 6" due to drilling.
	130									
120			C14	124/120	88	4 4 4 3 3 3 3 3 3 3	Fracture along moderately-dipping bedding plane.			C14: ALTERNATING BEDS OF SANDSTONE AND SILTSTONE/SHALE, beds are ~2-24" thick. Some irregular fractures, fractured zone at 99-103" and driller-created fracture zone at ~118". Fracture at 91" also shows irregular vertical fracture just below.
	140									
110			C15	121/120	87	3 3 3 4 4 4 3 3 3 3				C15: Similar to C14, planar fractures generally horizontal.
	150									
100			C16	121/120	100	3 3 3 3 3 3 4 4 4 4	Well-lithified fossil shell debris.			C16: INTERBEDDED SANDSTONE, SILTSTONE AND SHALE, predominantly sandstone, 51"-thick sandstone layer at 47", fossiliferous zones at 4" and 26", planar and horizontal fractures.
	160									Approximate top of Whetstone Gulf Formation - Unit A at depth 165 ft (El. 91.0 ft).
90			C17	124/120	85	4 4 3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 195.0

Boring No.
B106(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3	Slickensides on moderately-dipping fracture surfaces.			C17: SILTSTONE WITH INTERBEDDED SHALE, predominantly siltstone with interbedded shale and very little interbedded sandstone, highly fractured zone at 15-27" with a fracture set of ~30°, other fractures are planar and horizontal, spaced 1-24", siltstone and shale are soft.
						4				
						4				
	170					4	Fractured interval - 1 ft thick.			
						4				
						4				
						4	Bedding-parallel fractures.			
80			C18	121/120	92	5				C18: INTERBEDDED SANDSTONE AND SILTSTONE, with shale layers, most fractures are planar and horizontal, 1 vertical fracture filled with calcite at 91-97".
						5				
						5				
						5				
						5				
	180					5				
						5				
						5	Vertical fracture in sandstone. Each end of fracture terminated in siltstone. Calcite filled.			
						5				
						5				
70			C19	120/120	83	5				C19: INTERBEDDED SANDSTONE AND SILTSTONE WITH SHALE, siltstone and shale are dark gray, sandstone in gray. Fractures planar and generally horizontal, vertical fracture at bottom of core was driller-created.
						5				
						5				
						5				
						5				
	190					5				
						5				
						5				
						5				
						5				
60										Bottom of boring at depth 195 ft (El. 61.0 ft). Groundwater Monitoring well installed upon completion (screen interval: 172 ft to 192 ft). See separate Groundwater Well Installation Log for details.
							General Comments about Core Samples:			
	200						Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
50							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	210						Vertical fractures occasionally present in sandstone beds.			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 195.0

Boring No.
B106(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
40										
	220									
30										
	230									
20										
	240									
10										
	250									
0										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 130 ft. Natural gas observations recorded in field book and Well Level Measurement Form 162.1.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B106(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Keith A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kerr Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B107(MW)
Page 1 of 1

Boring Information

Northing : 1282275.5 **Easting :** 544161.8
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 256.2
Vertical Datum : NGVD 29
Rig Type/I.D: Mobile B57 /

Date Start - End: 9/10/2007 - 9/11/2007
Driller Name: Kevin Frome
Logged By : Erin Ringer
Drilling Company : Boart Longyear
Total Depth (ft) : 69.0

Drilling Information

Hammer Ident: NA
Auger I.D: NM
Auger Head Length: NM
Drilling Method: Auger (0-7.5 ft), air hammer (4 inch) (7.5-69 ft).

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
250										Boring advanced to 69 ft without sampling.
	10									
240										
	20									
230										
	30									
220										
	40									
210										
	50									
200										
	60									
190										
	70									Bottom of boring at depth 69 ft (El. 187.2 ft). Groundwater Monitoring well installed upon completion (screen interval: 57.7 ft to 68 ft). See separate Groundwater Well Installation Log for details.
180										

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B107(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Walter P. Shutsky Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Somers Date: 4/8/08

Rock Descriptions Checked by: Steph. L. Potts Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kerr Date: 4/8/08

Notes:

Form 150.3 rev. 1

Boring Information

Northing : 1280487.7 **Easting :** 543437.5
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 259.8
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 8/21/2007 - 8/29/2007
Driller Name: Kevin Busch
Logged By : C. Lee, K. Skinner
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Final Boring Log

Boring No.
B108(MW)

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: NM
Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 4.25-inch HSA to 5 ft, NQ2 wireline core from 5 ft to 150 ft.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
		X	S1	15/24	8-13-38-49	NA				S1: (0-2") WIDELY GRADED GRAVEL WITH SILT (GW-GM); ~80% fine to coarse gravel up to 1", ~10% fine sand, ~10% non-plastic fines. (2-15") Rock fragments, gray green sandstone, appears to be oswego sandstone. GLACIAL TILL. S2: Rock fragments, gray/green sandstone. Appears to be oswego formation. Approximate top of Oswego Sandstone at depth 2.2 ft (El. 257.6 ft).
		X	S2	10/10	56-104/4"	NA				
			C1	58/60	23	5 5 6 5 5	Bedding-parallel horizontal fractures.			C1: SANDSTONE, hard, slight weathering, regularly spaced fractures from 0.5-4.5", fractures are mostly planar, up to 30°, surfaces of fractures are fresh - slightly weathered. Areas of moderate fracturing at 23-26" and 30-32", color is light greenish-gray.
250	10		C2	60/60	61	3.5 2.5 2.5 3.5 3	Slight weathering in fracture surfaces. Iron oxide. 2-inch-thick clay interval, weathered shale, possible fault gouge. Moderately-dipping fracture. Siltstone lenses in sandstone.			C2: (0-21") Similar to C1, moderately fractured area at 4.5-15". (21-44") SANDSTONE INTERBEDDED WITH GRAYWACKE AND SHALE, hard-medium, slightly weathered, fractures spaced 0.5-7", joints range from planar - 20°, slight weathering on surface of joints, color is light green-ish gray. (44-48") SHALE, soft, severe weathering, no jointing, heavily fractured, gray. (48-60") Similar to C2 (0-21") with slight gray wacke interbedding.
			C3	116/120	77	3.5 3 3 3.5 3.5 2.5 3 3 4 3.5				C3: Similar to C2 (0-21"), planar - 20° fractures in joints, slight weathering on surface of joints, shale/graywacke lenses. 3-5.5" is siltstone (medium, slight weathering, planar fractures spaced 0.25-1", slight weathering on surface of joints, color is gray). 117.5-120" is graywacke (medium, slight weathering, planar jointing, slight weathering on surface of joints, gray).
240	20									
			C4	120/120	57	3.5 3.5 3.5 3.5 4.5 3.5 3.5 3.5 3.5 4 4.5	Increasing percentage of siltstone beds. Heavily fractured interval.			C4: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, hard, slight weathering, fractures ranging from 0.25-10.5", joints are planar - 30°, slight weathering on surface of joints, color is light greenish-gray. 6-18" is siltstone with sandstone interbedding (medium, slightly weathered, moderately fractured, dark gray). High % of siltstone and shale present at 50-65", 94-108" and 116-121".
230	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 135.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/29/2007
Total Depth (ft) : 150.0

Boring No.
B108(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C5	120/120	83	10.5, 8, 8, 9, 8.5, 10.5, 7, 7, 8, 7.5				C5: ARGILLACEOUS SANDSTONE, interbedded with sandstone, hard, slightly weathered, joints range from 0.5-14.5", joints are planar - 30°, color varies from light-dark brown, argillaceous beds range from 6-24", sandstone beds range from 2-10".
220	40									
			C6	117/120	63	9.5, 5, 4, 4, 5.5, 4, 5, 6, 12, 6.5				C6: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, hard, slightly weathered, joints range 0.25-13", faces are slightly weathered, joint inclination ranges from planar - 20°, color is predominantly light gray with dark gray lenses. Siltstone interbedding present 0-10", 53-60", 92-102".
										Approximate top of Oswego Transition Zone at depth 50 ft (El. 209.8 ft).
210	50									
			C7	120/120	98	6.5, 7, 3.5, 5, 6, 4.5, 5, 4.5, 4.5, 4.5	Slight to moderate weathering on fracture surfaces.			C7: (0-73") SANDSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE, hard, slightly weathered, jointing ranges from planar - 30°, faces of joints are slightly to moderately weathered showing secondary mineral replacement. Joint spacing ranges from 0.5-43". (73-120") ARGILLACEOUS SANDSTONE WITH INTERBEDDED SANDSTONE AND SILTSTONE, medium, joint spacing ranges from 0.5-43", faces of joints are slightly weathered, color varies from dark gray-light gray.
200	60									
			C8	120/120	83	3.5, 3.5, 3.5, 4.5, 4, 4, 5.5, 4.5, 5.5, 7	Heavily fractured interval. Bedding-parallel fractures.			C8: Similar to C7, joint spacing ranges from 0.5-33", joints are planar - 20° with slight weathering on joint faces.
190	70									
										Approximate top of Pulaski Formation - Unit A at depth 76 ft (El. 183.8 ft).
			C9	120/120	86	4.5, 5, 5, 6.5, 6, 5				C9: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE LENSES, medium, joint spacing ranges from 0.5-22", joint faces are planar - 10° with slight weathering on faces, color varies from gray-dark gray, shaley area present at 84-84.5".
180	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 135.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/29/2007
Total Depth (ft) : 150.0

Boring No.
B108(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						6 6.5 5.5 6				
			C10	119/120	84	3.5 3.5 5 5 5.5 4 5.5 5.5 5.5 6	Well-lithified fossil shell debris.			C10: Similar to C9, fossil debris present from 53-63", joints spaced 0.5-22" with slightly weathered faces.
170	90									
			C11	120/120	94	5 4 4 4 4 4 4 4 4.5 4	Sandstone lenses in siltstone.			C11: Similar to C10, joints spaced 0.5-15.5" with slightly weathered faces, joints are planar - 20°, 3" fossiliferous bed present in top 6" of core, slight fossil remnants present at 67".
160	100									
			C12	119/120	78	4 4.5 4.5 5 4 4 4.5 4.5 4.5 4				C12: ARGILLACEOUS SANDSTONE WITH INTERBEDDED SANDSTONE AND GRAYWACKE, medium, slightly weathered, joints spaced 10-17" with slightly weathered faces, joints are planar - 20°, abundant graywacke interbedding from 61-88" with beds ranging from 0.25-1", color varies from light-dark gray.
150	110									
			C13	120/120	98	3 4.5 4 4 4 5 4 4 4 4	Siltstone lenses in argillaceous sandstone.			C13: ARGILLACEOUS SANDSTONE WITH INTERBEDDED GRAY WACKE AND SILTSTONE, medium, slightly weathered, joints spaced 0.5-14", joint inclination ranges from planar - 20° with joint faces showing slight weathering, color varies from light-dark gray.
140	120									
			C14	120/120	98	3.5				C14: Similar to C13, joint inclination ranges from planar - 30°, joint faces are slightly weathered with gray wacke interbedding at 10-17" and shale lenses up to 0.5" thick from 110-120". White silicate clast approx. 0.25" at 40". color varies from light to dark green.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 135.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/29/2007
Total Depth (ft) : 150.0

Boring No.
B108(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4				
						4.5				
						4				
130	130					4				Approximate top of Pulaski Formation - Unit B at depth 131 ft (El. 128.8 ft).
						4.5				
						6.5				
						6				
						6				
						5				
			C15	119/120	92	4	Natural gas pocket at 135.5 ft. Drill water forced out of the top of casing, slight sulfuric odor.			C15: (0-12") Similar to C13. (12-120") ARGILLACEOUS SANDSTONE WITH INTERBEDDED SANDSTONE AND SILTSTONE AND SHALE, medium, fractures spaced 0.5-14", joints are planar - 30° with slight weathering on surface of joints. Fissile black shale at 116-120". Light gray sandstone (less argillaceous than rest of sample) at 74-98". Interbedded argillaceous sandstone with siltstone and gray wacke at 0-74". Color varies from light - dark gray.
						4				
						5				
						5				
						4				
120	140					4.5				
						4.5				
						4				
						4				
						4				
			C16	60/60	93	4	Sandstone lenses in siltstone.			C16: Similar to C15, joints spaced 0.5-13", faces are planar - 20°, color varies from light to dark gray.
						4				
						4				
						4				
						4				
110	150									Bottom of boring at depth 150 ft (El. 109.8 ft). Groundwater Monitoring well installed upon completion (screen interval: 138.8 ft to 149 ft). See separate Groundwater Well Installation Log for details.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
100	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
90	170						Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 135.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/29/2007
Total Depth (ft) : 150.0

Boring No.
B108(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
80	180									
70	190									
60	200									
50	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 135.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log Signature Page	Boring No. B108(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutes Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kay Date: 4/8/08

Notes: A. Cummings verified locations of fractures

Form 150.3 rev. 1

Boring Information

Northing : 1281864.9 **Easting :** 544562.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 262.5
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich B50 /

Date Start - End: 8/31/2007 - 9/7/2007
Driller Name: Wes Imhoff
Logged By : S. Mixan, K. Skinner, B. Bhattachaya
Drilling Company : Boart Longyear
Total Depth (ft) : 150.0

Final Boring Log

Boring No.
B109(MW)

Drilling Information

Hammer Ident: SN II
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Casing I.D: 4.25 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.5 ft
Drilling Method: 4.25-inch HSA to 2.5 ft, cored rock from 2.5 ft to 150 ft using NQ2 wireline core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	12/24	3-5-10-20	NA				S1: (0-6") SILTY SAND (SM); ~75% mostly fine sand, ~25% non-plastic fines, roots, brown. SURFICIAL DEPOSITS. <<FirstData(S1: (6-12") SILTY SAND (SM), similar to top 6" except no roots, light brown. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 2.5 ft (El. 260.0 ft).
260										
			C1	56/60	25	2, 2, 2, 2.5, 2.5	Iron oxide on fracture surfaces.			C1: SANDSTONE, light gray, hard, thinly bedded, fine-grained, well-sorted, rounded, rock has slight weathering, fractures are mostly 2-4" apart, horizontal (<10°) with surfaces that are slightly weathered. Zone of moderate fractures and weathering from 27" to 35" and bottom 6".
	10		C2	58/60	57	2.5, 2, 2, 3, 3	Bedding-parallel horizontal fractures. 1-inch-thick clay layer, shale weathered to clay.			C2: Similar to C1, a few zones of closely spaced fractures (fractures are as close as 0.25" and are shale-like fractures). Otherwise fractures are mostly 2-6" apart.
250										
			C3	122/120	83	2, 2, 2, 2, 2, 2, 2, 2, 2, 2	Siltstone clasts in sandstone.			C3: Similar to C1, fractures are approx. spaced 8-11", layer of sandstone interbedded with argillaceous sandstone and siltstone at 9.5-21". Fractures spaced 0.5-2", fracture surfaces are flat to slightly undulating, horizontal and slightly weathered. Can see bedding fractures and cracks, layers of heavy fossilization at 56" and 102".
	20									
240										
			C4	117/120	81	2, 2.5, 2.5, 3, 3.5, 2, 2, 2, 2, 2	Siltstone lenses in sandstone.			C4: Similar to C1, zones of sandstone interbedded with argillaceous sandstone and siltstone, moderate mottling, fractures are slightly weathered and planar to slightly undulating, angles are mostly horizontal, some horizontal fracture cracks (shale-type cracks) are visible. At 9-16" and 100-112" bedding is 2-3 mm and dipping at ~20°.
	30									
230										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29
Date Start / End: 8/31/2007 - 9/7/2007
Total Depth (ft) : 150.0

Boring No.
B109(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C5	122/120	80	2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3				C5: Similar to C1, top 5" bedding is dipping (10-30°), zones of sandstone interbedded with argillaceous sandstone, siltstone mottling and slight weathering. Zone at 88.5-122" has fractures spaced 0.25-3" and has some horizontal cracking.
220	40									
			C6	120/120	93	2, 2.5, 2, 2, 2.5, 2, 2, 3.5, 2.5, 2.5	More frequent interbeds of argillaceous sandstone and siltstone in sandstone.			C6: Similar to C1, interbedded argillaceous sandstone, siltstone and mottling is becoming more frequent.
210	50									
										Approximate top of Oswego Transition Zone at depth 56 ft (El. 206.5 ft).
			C7	123/120	90	2, 2.5, 2, 2.5, 2.5, 3.5, 2, 2, 4, 3	Fossiliferous.			C7: SANDSTONE INTERBEDDED WITH SILTSTONE, gray, hard, bedded, fine-grained, fresh, smooth, planar, fresh fractures spaced 6-12", mottled, fossiliferous.
200	60						4-inch-long vertical fracture.			Approximate top of Pulaski Formation - Unit A at depth 65 ft (El. 197.5 ft).
			C8	119/120	95	2.5, 2.5, 2.5, 3, 2, 2.5, 2, 2, 2, 4	Well-lithified fossil shell debris. Siltstone clasts and lenses in sandstone.			C8: SANDSTONE WITH INTERBEDDED SILTSTONE, light to dark gray, medium to hard.
190	70									
			C9	118/120	96	2.5, 2, 2.5, 2.5	Disrupted bedding (soft sediment deformation).			C9: SANDSTONE/SILTSTONE, light to dark gray, medium to hard, with interbedded layers of fossils and some interbedded layers of shale.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29
Date Start / End: 8/31/2007 - 9/7/2007
Total Depth (ft) : 150.0

Boring No.
B109(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures / Graphic Log	Soil-Sample Description Rock-Lithological Description
						2.5			
	80					3			
						3			
						2			
						2			
180						2			
			C10	120/120	99	3	Fossiliferous.		C10: Similar to C9, with few thinly interbedded shale layers.
						2			
						3.5			
						2.5			
						3			
	90					3			
						2.5			
						2.5			
170						2			
						2			
			C11	120/120	96	2.5	0.5-inch-thick bed of green mineral (marker bed).		C11: SANDSTONE/SILTSTONE, dark to light gray, medium to hard with few interbedded layers of shale (thin) and a fossil layer at 101.5".
						4			
						2.5			
						2			
						2.5			
	100					2.5			
						2.5			
						3			
160						3			
						2			
			C12	120/120	97	3			C12: SANDSTONE, numerous interbedded layers of siltstone, light to dark gray, and some thin layers of shale (black), hard to medium.
						3.5			
						2.5			
						2			
						2			
	110					2			
						4			
						3			Approximate top of Pulaski Formation - Unit B at depth 113 ft (El. 149.5 ft).
150						2			
						4			
			C13	119/120	90	2			C13: SILTSTONE, interbedded layers of sandstone and shale, dark gray, medium to hard. Layer of sandstone (light gray, fine-grained, medium to hard) with interbedded siltstone and trace of thin layered shale at 42-120".
						3			
						2.5			
						3.5			
						4.5			
	120					2			
						3			
						4.5			
140						5			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29
Date Start / End: 8/31/2007 - 9/7/2007
Total Depth (ft) : 150.0

Boring No.
B109(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4.5				
			C14	119/120	87	2.5 3 2.5 2 2 4 2 3 2 2.5	1-inch-thick clay layer, weathered shale, possible fault gouge material.			C14: SILTSTONE, dark gray to black, with thin to thick (~6") interbedded layers of sandstone. Approx. 1"-thick clay layer (soft, moderate plasticity, wet, gray) at 30".
	130									Approximate top of Pulaski Formation - Unit C at depth 132.5 ft (El. 130.0 ft).
130										
			C15	122/120	94	2 2.5 2 4 2.5 2.5 2 2 2.5 2.5	Vertical fracture in sandstone with calcite on fracture surfaces.			C15: SILTSTONE, dark to light gray, medium to hard, with interbedded thin layers of shale and thin to thick layers of sandstone, light gray.
	140									
120										
			C16	60/60	89	2 2 2 2.5 2.5	Well-lithified fossil shell debris.			C16: SILTSTONE, dark gray to black, hard, with interbedded layers of light gray sandstone.
	150									Bottom of boring at depth 150 ft (El. 112.5 ft). Groundwater Monitoring well installed upon completion (screen interval: 115 ft to 130 ft). See separate Groundwater Well Installation Log for details.
110										
	160									
100										

General Comments about Core Samples:

Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.

Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.

Vertical fractures occasionally present in sandstone beds.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29

Date Start / End: 8/31/2007 - 9/7/2007
Total Depth (ft) : 150.0

Final Boring Log

Boring No.
B109(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	170						Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted.			
90							Fracture surfaces are generally unweathered unless otherwise noted.			
	180									
80										
	190									
70										
	200									
60										
	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B109(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph L. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B110(MW)**

Boring Information

Northing : 1279838.6 **Easting :** 543552.2
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 267.1
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich B50 /

Date Start - End: 8/21/2007 - 8/30/2007
Driller Name: Wes Imhoff
Logged By : Shawn Mixan
Drilling Company : Boart Longyear
Total Depth (ft) : 225.0

Drilling Information

Hammer Ident: II
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Casing I.D: 4.25 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.5 ft
Drilling Method: 4.25 inch HSA through soil. NQ2 wireline coring in rock.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
			S1	18/24	5-8-28-32	NA		S1: SILTY SAND (SM); ~70% fine sand, ~20% non-plastic fines, ~10% fine to coarse, subangular gravel with max. size 1.5". Light brown. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 2.5 ft (El. 264.6 ft).
			C1	36/36	33	3, 4, 3	Slightly weathered - iron oxide staining.	C1: SANDSTONE, greenish-gray, hard, massive, generally fresh with minor slightly weathered zones, fine to medium grained, well-sorted, smooth to rough, near-horizontal, slightly weathered fractures typically spaced 4-6", highly fractured, severely weathered siltstone layer from 5.4-6.5 ft, minor argillaceous clasts.
260			C2	36/36	53	3, 4, 3	Horizontal bedding, parallel fractures. Siltstone/fractured interval.	C2: SANDSTONE, greenish gray to gray, medium to hard, massive, fine-grained, well-sorted, fresh, smooth to rough, near horizontal, slightly weathered fractures. Near-vertical, calcite-filled fracture at 8.8-9.7 ft, 3 moderately to severely weathered fractures from 9.7-10 ft, interbedded with silty sandstone.
	10		C3	55/60	65	2, 2.5, 3, 2, 2.5	Vertical calcite-filled fracture.	C3: SANDSTONE, greenish gray, hard, massive, mostly fine-grained, fresh, rough, near horizontal, slightly to moderately weathered fractures typically spaced 4-10", interbedded with minor siltstone laminations. Fractures typically associated with siltstone laminations.
250			C4	120/120	88	2.5, 2, 3, 2.5, 2, 2.5, 2, 3, 3.5, 3	Bedding-parallel fractures along siltstone and sandstone contacts. Siltstone clasts in sandstone. Shale bed - fissile (~6 inches). Shale bed - fissile (~12 inches).	C4: SANDSTONE, greenish gray, hard, massive, mostly fine grained, fresh, fractures typically present along contacts with siltstone layers, interbedded with thin siltstone layers from 19.6-24.2 ft, siltstone layers are fractured and moderately weathered, vertical fracture at 113-120" from top of core reacted slightly with HCl.
	20							
240			C5	120/120	88	2, 2, 3, 2, 3, 2, 3, 2, 2	Siltstone lenses in sandstone.	C5: SANDSTONE, greenish-gray, hard, massive, fine-grained, fresh, smooth to rough, near horizontal, slightly weathered fractures.
	30							

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2				
			C6	120/120	88	2 2 3 2 3 2 2 3 2 3				C6: SANDSTONE, greenish-gray, hard, massive, fine-grained, fresh, generally unfractured with one moderately weathered zone at 41.4-42.4 ft, interbedded with silty sandstone
230										
	40									
			C7	120/120	88	3 2 2 3 2 3 2 4 3 2				C7: SANDSTONE, greenish-gray, hard, massive, fine-grained, fresh, generally unfractured with 7 fractures along minor silty laminations.
220										
	50									
			C8	110/120	79	2 3 2 3 3 2 3 3 2 4	Crossbedding. Siltstone clasts in sandstone.			C8: Similar to C7 with minor interbedded siltstone and argillaceous clasts.
210										
	60									
			C9	120/120	83	2 3 3 3 4 3 3 2 4 3				Approximate top of Oswego Transition Zone at depth 67.5 ft (El. 199.6 ft).
200										
	70									C9: SANDSTONE, greenish-gray, hard, massive, fine-grained, fresh, smooth to rough, near horizontal, slightly weathered fractures, highly fractured, moderately weathered shale layer at 67.5-68.3 ft.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C10	120/120	88	2.5, 4, 3, 2.5, 3, 3, 3, 3, 4, 3.5				C10: SANDSTONE, greenish-gray, hard, massive, fresh, smooth, slightly weathered fractures, highly fractured, moderately weathered interbedded sandstone and shale at 80.8-81.6 ft and 82.1-82.4 ft.
190										
	80									
			C11	120/120	88	3.5, 3, 3, 2, 3, 2.5, 3, 2, 3, 2.5			Approximate top of Pulaski Formation - Unit A at depth 87.5 ft (El. 179.6 ft).
180							6-inch-thick siltstone bed (marker bed).			C11: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE, greenish-gray to gray, hard, bedded, fine to medium grained, fresh, smooth, near-horizontal, slightly weathered fractures, fractures typically spaced 6-12" apart, minor interbedded siltstone and shale.
	90									
			C12	117/120	80	3, 5, 3, 3, 4.5, 2.5, 3, 2.5, 3, 3			C12: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SANDSTONE, gray to greenish-gray, hard, massive, fine-grained, fresh, smooth, near horizontal, slightly weathered fractures typically spaced 6-16", fossiliferous.
170										
	100						Siltstone clasts and lenses in sandstone.			
			C13	120/120	94	6, 2.5, 3.5, 3, 2.5, 2.5, 5, 3.5, 4, 2.5				C13: ARGILLACEOUS SANDSTONE, gray to dark gray, medium, bedded, fine-grained, fresh, generally unfractured, a moderately weathered shale layer with interbedded siltstone and argillaceous sandstone at 109.3-110.2 ft, fossiliferous, interbedded with minor siltstone layers.
160										
	110						Highly fractured zone.			
										C14: ARGILLACEOUS SANDSTONE, gray to dark gray, hard, bedded, fine to medium grained, fresh, smooth to irregular, near horizontal, slightly weathered fractures, fossiliferous.
			C14	120/120	92	2, 2, 5				
150										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2.5 3 2.5 2.5 2.5 2 2	Siltstone clasts and lenses.			Approximate top of Pulaski Formation - Unit B at depth 121 ft (El. 146.1 ft).
140	120 130		C15	120/120	80	2 2 3 3 2 3 2.5 2 2 2.5	Fractures along irregular bedding planes.			C15: ARGILLACEOUS SANDSTONE, gray to dark gray, medium, irregular bedding, fine to medium grained, fresh, smooth to irregular fractures typically spaced 4-10", fossiliferous, interbedded fossiliferous sandstone layers, minor interbedded shale.
130	140		C16	111/120	93	2.5 3 3 2 2.5 2.5 3 2.5 2 3	Highly fossiliferous.			C16: ARGILLACEOUS SANDSTONE, gray to dark gray, hard, irregular bedding, fine to medium grained, fresh, smooth to rough, near horizontal, slightly weathered fractures typically in thin shale layers and spaced 4-24", highly fossiliferous.
120	150		C17	103/120	83	2 2 5 2 4 2.5 3.5 4 3.5 5	Lenses and clasts of siltstone.			C17: ARGILLACEOUS SANDSTONE, gray to dark gray, hard, irregular bedding, fine to medium grained, fresh, smooth to rough, near horizontal, slightly weathered fractures typically spaced 6-16", minor thin interbedded layers of shale and siltstone.
										Approximate top of Pulaski Formation - Unit C at depth 155.5 ft (El. 111.6 ft).
110	160		C18	136/120	65	5 3 2.5 2.5 3 2	2-foot-long vertical fracture, calcite filled. Fractured interval, bedding-parallel fractures.			C18: (0-31") Similar to C17, healed, calcite-filled fracture at 28". (31-136") SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, gray to black, medium to hard, massive to bedded, fresh to moderate, slightly to moderately weathered fractures typically spaced 1-6".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2 NM NM NM				
			C19	120/120	82	NM				C19: (0-58") Similar to C18 (31-136"). (58-120") SANDSTONE, light gray to gray, hard, massive, fine to medium grained, fresh, generally unfractured.
100										
	170						Relatively few fractures.			
			C20	120/120	88	3.5 3 3 2 2.5 2.5 3 3 2 3				C20: SANDSTONE, gray to dark gray, medium, generally massive with minor cross bedding, fine to medium grained, fresh, generally unfractured, fossiliferous, interbedded layers of argillaceous sandstone, siltstone and shale.
90										
	180						Siltstone lenses.			
			C21	120/120	96	2 2 3 4.5 1.5 2.5 3 4 3.5 3				C21: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray to black, massive, fresh, generally unfractured, fractures typically present along contacts with siltstone and shale, fossiliferous.
80										
	190						Fossiliferous. Clay interval. Weathered shale, possible fault gouge.			
			C22	120/120	80	3 3 2.5 3 3 2 2 2 2 2				C22: (0-55") SANDSTONE, gray to dark gray, hard, massive to irregular bedding, fresh, fractures typically present along contacts with shale, fossiliferous. (55-120") SILTSTONE, dark gray to black, medium, laminated, slightly weathered, smooth, near horizontal, slightly to moderately weathered fractures. Approximate top of Whetstone Gulf Formation - Unit A at depth 199.5 ft ((El. 67.6 ft).
70										
	200						Siltstone lenses.			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
60	210		C23	120/120	86	3 2 2.5 2 2.5 2 2 2.5 2 2.5				C23: SILTSTONE, dark gray to black, medium, generally massive to finely laminated, fresh, generally unfractured, interbedded sandstone layers.
50	220		C24	120/120	83	2.5 2 2 2.5 2.5 2 2 2.5 2 3	Dip-slip slickenside on moderately-dippig fracture face.			C24: INTERBEDDED SANDSTONE AND SILTSTONE, gray to black, hard to medium, bedded, fresh, slightly to moderately weathered fractures in siltstone, fossiliferous.
40	230						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			Bottom of boring at depth 225 ft (El. 41.9 ft). Groundwater Monitoring well installed upon completion (screen interval: 204.2 ft to 224.7 ft). See separate Groundwater Well Installation Log for details.
30	240						Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds. Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Date Start / End: 8/21/2007 - 8/30/2007
Total Depth (ft) : 225.0

Boring No.
B110(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
20							unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
	250									
10										
	260									
0										
	270									
-10										
	280									
-20										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B110(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Steph J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B111(MW)

Boring Information

Northing : 1279841.1 **Easting :** 543563.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 266.9
Vertical Datum : NGVD 29
Rig Type/I.D: Mobile B57 /

Date Start - End: 9/11/2007 - 9/12/2007
Driller Name: Kevin Frome
Logged By : Erin Ringer
Drilling Company : Boart Longyear
Total Depth (ft) : 87.5

Drilling Information

Hammer Ident: NA
Auger I.D: NM
Auger Head Length: NM

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

Drilling Method: 6-inch casing to 5 ft. Drilled rock from 5 ft to 87 ft with 4-inch air hammer.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260	10									Boring advanced to 87.5 ft without sampling.
250	20									
240	30									
230	40									
220	50									
210	60									
200	70									
190	80									
180	90									Bottom of boring at depth 87.5 ft (El. 179.4 ft). Groundwater Monitoring well installed upon completion (screen interval: 74 ft to 84.6 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B111(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pott Date: 4/7/08

Drilling and Sample Information Checked by: Bob M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B112(MW)

Boring Information

Northing : 1280382.8 **Easting :** 544368.5
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 282.9
Vertical Datum : NGVD 29
Rig Type/I.D: Mobile B57 /

Date Start - End: 8/27/2007 - 9/8/2007
Driller Name: Kevin Frome
Logged By : Erin Ringer
Drilling Company : Boart Longyear
Total Depth (ft) : 203.5

Drilling Information

Hammer Ident: SN V
Auger I.D: 4.25 inch
Auger Head Length: 6 inch

Casing I.D: 4.25 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.1 ft

Drilling Method: HSA to 18 ft, replaced with 4 inch casing then wireline coring (18 ft-203.5 ft).

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
		X	S1	24/24	3-4-7-7	NA				S1: SILTY SAND WITH GRAVEL (SM); ~70% fine sand, ~15% gravel to 1" (subangular), ~15% fines, brown. SURFICIAL DEPOSITS.
280										Approximate top of Glacial Till at depth 3.5 ft (El. 279.4 ft).
		X	S2	16/24	3-15-39-19	NA				S2: SILTY SAND WITH GRAVEL (SM); 41% fine to coarse sand, 31% non-plastic fines, 28% fine to coarse gravel up to 1.5" max size, light brown. (Laboratory grain-size analysis performed.) GLACIAL TILL.
	10	X	S3	24/24	26-29-41-41	NA				S3: SILTY SAND WITH GRAVEL (SM); 47% fines (LL= NV, PI = NP), 41% mostly fine to medium sand, 12% fine gravel, light brown. (Laboratory grain-size and Atterberg limit tests performed). GLACIAL TILL.
270										S4: SILTY SAND WITH GRAVEL (SM); Similar to S3 with one 1" layer of fractured rock. GLACIAL TILL.
		X	S4	17/24	4-9-20-27	NA				Approximate top of Oswego Sandstone at depth 18 ft (El. 264.9 ft).
	20		C1	33/60	100	NM	Slightly weathered - iron oxide on fracture surfaces.			C1: SANDSTONE, gray, hard, massive, fine-grained, fresh, generally unfractured, slightly weathered, smooth, horizontal fracture at 19 ft.
260			C2	25/18	92	NM				C2: Similar to C1.
	30		C3	114/120	88	3 2 3 3 3 2 3 3 3	Horizontal bedding-parallel fractures.			C3: SANDSTONE, gray, hard, massive, fine-grained, fresh, generally horizontal, fresh fractures spaced 1-17", 15-25°.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Date Start / End: 8/27/2007 - 9/8/2007
Total Depth (ft) : 203.5

Boring No.
B112(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
250						3				
			C4	123/120	92	2 3 2 3 3 2 2 2 2 2	Lenses of siltstone in sandstone. Cross bedding.			C4: SANDSTONE, gray, hard, fresh, fine-grained, smooth planar fractures typically spaced 3-18", mottled sandstone and shale at 38.1-38.3 ft and 43.2-43.4 ft.
	40									
240							6-inch-long vertical fracture in sandstone.			
			C5	123/120	80	2 2 3 2 2 3 3 2 3 3				C5: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, gray to dark gray, hard sandstone, soft siltstone, massive, fine grained, fresh, generally smooth horizontal fractures, highly fractured zones at 44.5-45.2 ft and 53.8-54.5 ft, 6" vertical fracture at 52 ft.
	50									
230							8-inch-long vertical fracture in argillaceous sandstone.			C6: SANDSTONE INTERBEDDED WITH SILTY SHALE, gray, hard, massive, fine-grained, fresh, smooth and rough horizontal fractures (fresh) spaced 2-6", a few highly fractured zones. Approximate top of Oswego Transition Zone at depth 57.5 ft (El. 225.4 ft).
			C6	120/120	78	3 3 2 2 2 NM NM NM NM NM				
	60						Siltstone lenses in sandstone.			
220										
			C7	120/120	93	3 2 3 3 3 2 2 2 2 2	Siltstone lenses in sandstone.			C7: SANDSTONE OCCASIONALLY INTERBEDDED WITH SILTY SHALE, gray, hard, fine-grained, massive, fresh with smooth, planar, fresh fractures spaced 1-18".
	70									
210										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Date Start / End: 8/27/2007 - 9/8/2007
Total Depth (ft) : 203.5

Boring No.
B112(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C8	121/120	96	1 2 2 2 4 NM NM 3 3 3	Siltstone clasts.			C8: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE, hard, gray, bedded, fine-grained, fresh planar, generally smooth fresh fractures typically spaced 2-18".
	80									
200										
			C9	119/120	89	3 2 2 3 3 3 3 3 NM NM	Shaly partings. Siltstone clasts. Cross-bedding.			C9: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE, gray, hard, massive, fresh, smooth, near-horizontal, fresh fractures typically spaced 6-24", a highly fractured zone at 85.7-85.9 ft.
	90									
190										
			C10	122/120	91	NM NM 3 3 3 2 3 3 NM 3	4-inch-long near-vertical fracture in sandstone.			C10: SANDSTONE INTERBEDDED WITH SILTY SHALE, gray to dark gray, hard, bedded, fine-grained, fresh, smooth planar fresh fractures located in weaker shale layers and spaced 2-6", no highly fractured zones.
	100									
180										
			C11	120/120	92	3 3 3 2 2 2 2 2 2	Siltstone in sandstone.			C11: SANDSTONE INTERBEDDED WITH SHALE AND SILTSTONE, gray to dark gray, hard, fine-grained, bedded, fresh, smooth, horizontal fresh fractures typically spaced 3-12", fossiliferous zone at 110-111 ft.
	110									
170										
			C12	122/120	98	5 4				C12: SANDSTONE INTERBEDDED WITH SHALE AND SILTSTONE, gray to dark gray, hard, bedded, fine-grained, fresh, smooth, planar, fresh fractures spaced 5-18", fossiliferous and mottled throughout.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Date Start / End: 8/27/2007 - 9/8/2007
Total Depth (ft) : 203.5

Boring No.
B112(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3				Approximate top of Pulaski Formation - Unit A at depth 117.5 ft (El. 165.4 ft).
						3				
						4				
						3				
	120					3				
						3	Fossiliferous.			
						3				
160						3				
			C13	115/120	92	3				C13: Similar to C12 with some laminar bedding, less fossiliferous.
						3				
						2				
						2				
						2				
						3	Disrupted bedding (soft sediment deformation).			
	130					3				
						3				
						3				
						3				
150										
			C14	121/120	97	3				C14: SILTSTONE AND SHALE INTERBEDDED WITH SANDSTONE, gray to dark gray, hard, bedded, fine-grained, fresh, smooth planar fractures spaced 4-12", some laminar bedding present, mottled.
						3				
						3				
						3				
						3				
						3				
	140					2				
						2				
						2				
						3				
140										
			C15	124/120	97	3				C15: SILTSTONE INTERBEDDED WITH SANDSTONE, gray to dark gray, bedded, fine-grained, hard, fresh, smooth, planar fractures spaced 6-12", highly fractured zone of shale at 148.3-148.4 ft, fossiliferous at 148.4-149 ft and 150.7-151.1 ft.
						2				
						2				
						2	Highly fractured interval.			
						3				
						3				
	150					2				Approximate top of Pulaski Formation - Unit B at depth 150.5 ft (El. 132.4 ft).
						2	Disrupted bedding (soft sediment deformation), mottled appearance.			
						2				
						2				
130										
			C16	111/120	92	2				C16: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray to dark gray, hard, bedded, fine-grained, fresh, smooth, planar, fresh - slightly weathered fractures at 2-12", bed of mostly sandstone at 161.3-164.5 ft.
						2				
						2				
						1				
						2				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Boring No. **B112(MW)**

Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Date Start / End: 8/27/2007 - 9/8/2007
Total Depth (ft) : 203.5

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
						3		
	160					3		
						3		
						3		
						3		
120								C17: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, hard, gray, bedded, fine-grained, fresh, rough and smooth planar fractures spaced 2-8", highly fractured zone at 173.7 ft, 3" clay layer at 171.1 ft.
			C17	122/115	80	3		
						3		
						3		Approximate top of Pulaski Formation - Unit C at depth 167 ft (El. 115.9 ft).
						2		
						3		
						3		
	170					3		
						2	Moderately-dipping dip-slip slickensides.	
						3	3-inch-thick clay layer - weathered shale. Possible fault gouge material.	
						3		
110								
			C18	119/125	90	3	Shaly partings.	
						3		C18: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray - dark gray, fine-grained, large bedding, hard, fresh, smooth, planar, fresh fractures, spaced 6-12", highly fractured zone at 174.5-174.8 ft, vertical fracture at 178.8-179.3 ft.
						3	30° fracture. Dip-slip slickensides.	
						2		
						3		
						2		
						2	Near-vertical fracture in siltstone.	
	180					2		
						3		
						3		
100								Approximate top of Whetstone Gulf Formation - Unit A at depth 184 ft (El. 98.9 ft).
			C19	111/120	78	4	Fossiliferous.	C19: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray to dark gray, hard - medium, bedded, fine-grained, fresh, planar and angular, smooth and rough, fresh fractures spaced 4-12", 4 inclined fractures at ~10-20°, more frequently fractured than C18.
						3		
						3		
						3		
						3		
	190					2		
						1		
						2		
						2		
90								
			C20	116/108	85	2		C20: SANDSTONE INTERBEDDED WITH SILTSTONE, hard, bedded, fine-grained, fresh, smooth fresh planar fractures spaced 6-12", highly fractured zone at 200.1-201.5 ft.
						3		
						2		
						2		
						3		
						2		
	200					2		
						2		

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.2 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Date Start / End: 8/27/2007 - 9/8/2007
Total Depth (ft) : 203.5

Boring No.
B112(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2				
80										Bottom of boring at depth 203.5 ft (El. 79.4 ft). Groundwater Monitoring well installed upon completion (screen interval: 170 ft to 190 ft). See separate Groundwater Well Installation Log for details.
	210						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
70							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	220						Vertical fractures occasionally present in sandstone beds.			
60							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted.			
	230						Fracture surfaces are generally unweathered unless otherwise noted.			
50										
	240									
40										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Possible artesian conditions

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B112(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: [signature] Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: [signature] Date: 4/8/08

Rock Descriptions Checked by: [signature] Date: 4/7/08

Drilling and Sample Information Checked by: [signature] Date: 4/8/08

Notes: A. Cummings verified locations of fractures

Form 150.3 rev. 1

Final Boring Log

Boring No.
B113(MW)
Page 1 of 1

Boring Information

Northing : 1280379.7 **Easting :** 544381.4
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 283
Vertical Datum : NGVD 29
Rig Type/I.D: / BL5

Date Start - End: 9/10/2007 - 9/10/2007
Driller Name: M.Mueller
Logged By : Jay Scully
Drilling Company : Boart Longyear
Total Depth (ft) : 111.0

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 4 inch
Casing I.D: NM
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA
Drilling Method: 4.25-inch HSA to 18 ft, 4-inch air hammer used to drill rock down to 111 ft.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
280										Boring advanced to 113 ft without sampling.
	10									
270										
	20									
260										
	30									
250										
	40									
240										
	50									
230										
	60									
220										
	70									
210										
	80									
200										
	90									
190										
	100									
180										
	110									
170										Bottom of boring at depth 111 ft (El. 172.0 ft). Groundwater Monitoring well installed upon completion (screen interval: 80.5 ft to 90.5 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B113(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Charles P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B114(MW)**

Boring Information

Northing : 1280763.3 **Easting :** 544983
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Rig Type/I.D: Dietrich D50 / BL2

Date Start - End: 8/30/2007 - 9/12/2007
Driller Name: P. Dickensen, R. Ochs
Logged By : Chad Conti
Drilling Company : Boart Longyear
Total Depth (ft) : 193.5

Drilling Information

Hammer Ident: SN I
Auger I.D: 4.25 inch
Auger Head Length: 6 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: HSA: 0-9 inches, coring 9 inches-193.5 ft (with NQ2).

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	2/9	3-25	NA				S1: SILTY SAND WITH GRAVEL (SM); ~60% sand, ~20% non-plastic fines, ~20% gravel to 0.5". Brown. Roots and plant debris. SURFICIAL DEPOSITS. Approximate top of Oswego Sandstone at depth 0.75 ft (El. 273.2 ft).
270			C1	56/54	25	3 3 3 3	Horizontal bedding-parallel fractures. Moderate weathering - iron oxide staining.			C1: SANDSTONE, some interbedded siltstone. Hard, fine-grained, fractures spaced 0.5-5" and generally horizontal, one vertical fracture at 28" probably driller-created during extraction of core, gray. Clayey layer at 30".
	10		C2	60/60	87	4 5 4 5 3	Clay layer - weathered siltstone.			C2: SANDSTONE, some areas of higher silt content, planar horizontal fractures, unweathered, fine-grained, gray-green.
260			C3	115/120	95	4 6 5 5.5 6 5 4.5 5 5.5 NM	Dip-slip slickenside fracture surface (moderately dipping).			C3: SANDSTONE, few areas of interbedded siltstone and shale, mainly at 3" and 52" (layers are mottled and slightly fissile), fractures generally planar and horizontal, 45° fracture at 75", sandstone gray/green with some darker areas of siltier material, fine-grained.
250	20		C4	119/120	93	3 3 3.5 3.5 4 4 4 5 5 4	Siltstone lenses and clasts. Fractures occur along siltstone/sandstone contacts.			C4: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, shale and siltstone layers at 42", 53" and 92". Some mottling above and below each layer. Sandstone is fine-grained, gray/green. Gray - dark gray shale and siltstone, planar fractures spaced 1-29", shale/siltstone layers are fissile, all fractures are horizontal.
	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/12/2007
Total Depth (ft) : 193.5

Boring No.
B114(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
240			C5	122/120	92	4 4 3 3 3.5 3 4 3.5 4 3.5				C5: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, shaley layers with higher fissility at 0" and 80". Sandstone becoming increasingly argillaceous, layer of disturbed sediment with concretions at 46". Sandstone is gray-green, siltstone and shale are dark gray, fine-grained. Fractures planar and horizontal spaced 1-27".
	40									
230			C6	120/120	83	3 3 3.5 3.5 3 4 5 4 5 4				C6: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, shale layers at 25" and 47", gray-green sandstone with dark gray siltstone and shale. Generally planar to slightly irregular fractures horizontal, fine-grained.
	50									
220			C7	118/120	93	3.5 3 3 3.5 3.5 3.5 4 3 3 4	Cross-bedding. Thin shale layers. Calcite-filled vertical fracture. 6-inch-thick siltstone/shale layer.			C7: SANDSTONE WITH INTERBEDDED SILTSTONE, very little shale, fractures planar and horizontal, one vertical fracture at 41-47", filled with calcite (minor reaction with HCl), fracture is very thin and fresh. Sandstone is becoming less green, siltstone/shale dark gray, fine-grained.
	60									
210			C8	122/120	92	3.5 3 3 3 2.5 2.5 2.5 2.5 2.5 2.5	Siltstone clasts and lenses in sandstone.			C8: Similar to C7, some mottling, cross-bedding, fractures generally horizontal and planar, spaced 1-33".
	70									
200			C9	57/54	95	6 3 3 3.5	Inclined fracture along moderately-dipping bedding plane.			C9: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, some mottling. Planar, horizontal fractures spaced 1-39", fine-grained, light gray sandstone, dark gray siltstone/shale, 30° fracture at 18".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/12/2007
Total Depth (ft) : 193.5

Boring No.
B114(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
										Approximate top of Oswego Transition Zone at depth 79 ft (El. 195.0 ft).
	80		C10	64/66	91	5, 4, 4, 3.5, 3.5				C10: SANDSTONE WITH SILTSTONE, sandstone with numerous layers of interbedded siltstone with some shale, light gray sandstone with dark gray siltstone/shale, fractures generally planar and horizontal.
190			C11	121/120	100	2.5, 4, 4, 4, 4, 3.5, 3.5, 3, 2.5, 3	Thin laminations.			C11: SANDSTONE WITH SILTSTONE, sandstone with numerous layers of interbedded siltstone with some shale, light to dark gray, medium to hard, fractures planar and horizontal.
	90									Approximate top of Pulaski Formation - Unit A at depth 90.5 ft (El. 183.5 ft).
180			C12	76/78	89	2.5, 3, 6.5, 2.5, 3.5, 3				C12: SILTSTONE, with fossil layer at 15-22" and sandstone. Dark to light gray, medium to hard, fractures planar and horizontal, fractures spaced 1-50", fresh.
	100		C13	44/42	86	3, 5, 4.5, 3	Fossil debris - well-lithified clastic hash.			C13: SANDSTONE AND SILTSTONE, with interbedded fossil and shale layers, light to dark gray, medium to hard, fractures are planar and horizontal.
170			C14	118/120	96	3, 2.5, 2, 2.5, 3.5, 4, 3, 4, 3, 3	Fossil shell fragments.			C14: SILTSTONE WITH INTERBEDDED SANDSTONE, light to dark gray, medium to hard. Fractures planar and horizontal, shale layer at 106" with numerous fractures spaced 0-40".
160	110		C15	120/120	99	5, 3, 2.5, 2.5, 3.5, 4, 3, 3, 3	Lenses of siltstone in sandstone.			C15: SANDSTONE AND SILTSTONE, with shale layers, light to dark gray, medium to hard, mottling, fractures planar and horizontal.
	120									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/12/2007
Total Depth (ft) : 193.5

Boring No.
B114(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3.5				
150			C16	120/120	97	3.5 2 4 2 2.5 1.5 2.5 2.5 3 3	Clasts, disrupted bedding (soft sediment deformation), fossils.			C16: SANDSTONE AND SILTSTONE, with shale layers, light to dark gray, medium to hard sandstone, soft siltstone and shale. Fractures planar and horizontal spaced 1-21".
	130									Approximate top of Pulaski Formation - Unit B at depth 132.5 ft (El. 141.5 ft).
140			C17	120/120	93	5.5 3 3 3 4 4 3 3 3 4.5				C17: SILTSTONE WITH INTERBEDDED SANDSTONE AND SHALE, light gray to dark gray, sandstone medium, siltstone soft. Fractures mainly planar and horizontal, fractures at 115" and 118" approx. 20°, fresh, fossiliferous layer at 15-21".
	140									Approximate top of Pulaski Formation - Unit C at depth 144 ft (El. 130.0 ft).
130			C18	112/120	87	4 4 3 3.5 4.5 5.5 3 3 3 4	Slickensides.			C18: ALTERNATING SANDSTONE WITH SILTSTONE AND SHALE, light gray to dark gray, sandstone medium, siltstone soft, two 20° fractures at 6" and 89". Horizontal fractures with high shale content, fresh.
	150									
120			C19	120/108	98	4 3.5 3 3 4 5 3 3.5 3.5				C19: SILTSTONE WITH INTERBEDDED SANDSTONE AND SHALE, dark gray siltstone soft, fractures mainly planar and horizontal, fresh.
	160									
			C20	10/12	60	3.5				C20: SILTSTONE WITH INTERBEDDED SANDSTONE AND SHALE, dark gray, siltstone soft, sandstone hard, fractures mainly planar and horizontal, fresh.
110			C21	117/120	93	3.5				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/12/2007
Total Depth (ft) : 193.5

Boring No.
B114(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 3 3.5 2.5 4.5 3.5 3 3.5 4.5				C21: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, light gray to dark gray, sandstone hard, siltstone soft, fractures mainly planar and horizontal, fresh.
	170									
100			C22	123/120	84	7 3 4.5 3 3 5 3.5 3 3 4	Natural gas pocket at 173.5 ft. Over LEL, circulated water, drilling resumed. Highly fractured shale interval (~12 inches). Highly fractured shale interval (~6 inches). Thin shale laminations.			C22: ALTERNATING BEDS OF SILTSTONE AND SANDSTONE, with interbedded shale. Medium sandstone, soft shale/siltstone, light gray to dark gray. Fractures generally planar and horizontal, highly fractured zones of silty shale with fractures ranging from horizontal to vertical at 20-24", 36-39" and 59-64". Highly fossiliferous layer of shell fragments at 115".
	180									
90			C23	123/120	92	5 3 4.5 5 3 3 3 3 2.5 2.5	Fossiliferous.			C23: SANDSTONE AND SILTSTONE. Predominantly sandstone at 0-57", predominantly siltstone with interbedded shale at 57-123". Fractures planar to slightly irregular and generally horizontal, 15° fracture at 54", fresh. Fossiliferous layer at 0-13" (continuation from C22). Approximate top of Whetstone Gulf Formation - Unit A at depth 190 ft (El. 84.0 ft).
	190									
80							General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account. Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds.			Bottom of boring at depth 193.5 ft (El. 80.5 ft). Groundwater Monitoring well installed upon completion (screen interval: 134 ft to 144.4 ft). See separate Groundwater Well Installation Log for details.
	200									
70										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 274
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/12/2007
Total Depth (ft) : 193.5

Boring No.
B114(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	210						Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
60										
	220									
50										
	230									
40										
	240									
30										
	250									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B114(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutt Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Stephen A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B115(MW)
Page 1 of 1

Boring Information

Northing : 1280775 **Easting :** 544989.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 274.3
Vertical Datum : NGVD 29
Rig Type/I.D: Mobile B57 / BL5

Date Start - End: 9/17/2007 - 9/17/2007
Driller Name: Mike Mueller
Logged By : Chad Conti
Drilling Company : Boart Longyear
Total Depth (ft) : 93.5

Drilling Information

Hammer Ident: NA
Auger I.D: NM
Auger Head Length: 6 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA
Drilling Method: Auger 0-9 inches, Air hammer 9 inches to 93.5 ft with air hammer.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
270										Boring advanced to 93.5 ft without sampling.
	10									
260										
	20									
250										
	30									
240										
	40									
230										
	50									
220										
	60									
210										
	70									
200										
	80									
190										
	90									
180										Bottom of boring at depth 93.5 ft (El. 180.8 ft). Groundwater Monitoring well installed upon completion (screen interval: 82 ft to 92 ft). See separate Groundwater Well Installation Log for details.
	100									
170										

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B115(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Walter P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Stephen L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B116(MW)

Boring Information

Northing : 1279550.8 **Easting :** 544655.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 294.8
Vertical Datum : NGVD 29
Rig Type/I.D: CME75 / N1

Date Start - End: 8/29/2007 - 8/30/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 155.5

Drilling Information

Hammer Ident: SN III
Auger I.D: 4.25 inch
Auger Head Length: 4 inch

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: HSA to 18.9 ft, replaced HSA with 6-inch casing after soil sampling was completed, cored bedrock with NQ2 core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	18/24	10-26-30-30	NA				S1: SANDY SILT (ML); ~50% low plasticity fines, ~45% fine to coarse sand, ~5% fine to coarse gravel. Light brown, occasional fragments of Oswego Sandstone. FILL.
290			S2	11/24	6-5-3-3	NA				S2: SANDY SILT (ML); ~50% low plasticity fines, ~45% fine to coarse sand, ~5% fine to coarse gravel. Light brown, occasional fragments of Oswego Sandstone. FILL.
	10		S3	0/24	8-9-11-16	NA				S3: NO RECOVERY Description from soil on outside of sampler: SANDY SILT with GRAVEL (ML); ~70% medium plasticity fine, ~15% fine to coarse sand, ~15% fine to coarse gravel. Light brown. FILL. Approximate top of Glacial Till at depth 12.5 ft (El. 282.3 ft).
280			S4	15/12	30-50/6"	NA				S4: SILTY SAND (SM); 49% fines (LL = 15, PI = 2), 47% mostly fine to medium sand, 4% fine gravel, light brown. (Laboratory grain-size and Atterberg limit tests performed.) GLACIAL TILL. Approximate top of Oswego Sandstone at depth 18.9 ft (El. 275.9 ft).
	20		C1	9/30	17	3 3 NM	Auger refusal at 18.9 ft			C1: SANDSTONE (0-5") Gray, medium, fossiliferous, entire section reacts with acid, fresh rock, cross-bedding visible. (5-9") Wet, light gray clay with medium to coarse gravel.
			C2	51/48	92	4.5 Avg.	Core barrel became blocked at 21.5 ft 4-inch-thick clay layer, light gray with fault breccia.			C2: SANDSTONE (0-3") Gray sandstone, similar to 0-5" of C1, highly fractured due to hard drilling. (3-51") Light gray, medium, well-sorted sandstone. Fresh rock, horizontal joints spaced 2-14".
270			C3	116/120	76	2.5 Avg.	Lenses and clasts of siltstone. Bedding-parallel fractures with smooth surfaces.			C3: Similar to 3-51" of C2.
	30						Fossiliferous.			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 295
Vertical Datum : NGVD 29
Date Start / End: 8/29/2007 - 8/30/2007
Total Depth (ft) : 155.5

Boring No.
B116(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures / Graphic Log	Soil-Sample Description Rock-Lithological Description
260									
			C4	114/120	79	2.5 Avg.	Clasts of siltstone in sandstone.		C4: SANDSTONE, similar to C3, except mottling and cross-bedding. Mottling/interbedded soft siltstone at 0-8", 26", 112". Cross-bedding at 96-98", band of red mineral at 100".
	40								
							Thin reddish layer.		
250									
			C5	121/120	98	2.5 Avg.			C5: SANDSTONE, similar to C3, except more interbedded siltstone and cross-bedding.
							Crossbedding.		
	50								
									Approximate top of Oswego Transition Zone at depth 55 ft (El. 239.8 ft).
240									
			C6	121/120	93	2.5 Avg.			C6: SANDSTONE, light gray, hard sandstone with some interbedded silty shale. Silty shale is dark gray/black, soft and laminated. Fresh rock throughout, horizontal joints spaced 1-47", core was mostly long (>12") pieces.
	60								
230							Siltstone lenses and clasts.		
			C7	118/120	96	2 Avg.			C7: SANDSTONE, light gray, medium sandstone with interbedded dark gray, soft siltstone. Mottling at 29" and 39", fresh rock throughout, horizontal joints spaced 3-36".
	70								
220									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 295
Vertical Datum : NGVD 29
Date Start / End: 8/29/2007 - 8/30/2007
Total Depth (ft) : 155.5

Boring No.
B116(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C8	119/120	93	3 3.5 3.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	12-inch-thick siltstone layer (marker bed). Distinct bedding, trace fossils.			C8: SANDSTONE, similar to C3, except large shale layer at 15-30". Approximate top of Pulaski Formation - Unit A at depth 80 ft (El. 214.8 ft).
210	80		C9	120/120	96	2 Avg.	Fossiliferous - shell debris.			C9: SANDSTONE, light gray, medium/hard sandstone. Thick fossil/mottled layer at 77-81", layer of dark gray/black, soft siltstone at 0-4". Fresh rock throughout, horizontal joints spaced 3-35".
200	90		C10	120/120	98	2 Avg.	Irregular fracture surfaces around siltstone clasts and along sandstone/siltstone contacts.			C10: SANDSTONE, light gray, medium sandstone with some interbedded siltstone. Fresh rock throughout, horizontal joints spaced 3-73".
190	100		C11	120/120	100	3 3 3 2 2 2 3 3 3 3				C11: SANDSTONE WITH SILTSTONE, similar to C10, except thicker siltstone layers (~6-8"). Fresh rock, horizontal joints spaced 5-30", thick sandstone layer at 57-83". Approximate top of Pulaski Formation - Unit B at depth 110 ft (El. 184.8 ft).
180	110		C12	118/120	96	2.5 Avg.				C12: SANDSTONE WITH SILTSTONE, light gray, medium sandstone interbedded with dark gray, soft siltstone. Fresh rock throughout, horizontal joints spaced 3-15".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 295
Vertical Datum : NGVD 29
Date Start / End: 8/29/2007 - 8/30/2007
Total Depth (ft) : 155.5

Boring No.
B116(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	120						Fossiliferous.			
170										
			C13	120/120	100	2.5 Avg.				C13: SILTSTONE WITH SANDSTONE, similar to C12, except core is predominantly soft, dark gray siltstone.
	130						Abundant marine fossil debris.			
160										
			C14	115/120	94	2 Avg.				C14: SILTSTONE, soft, dark gray siltstone with some interbedded light gray, medium sandstone. Sandstone layers are ~1-3" thick. Fresh rock throughout, horizontal joints spaced 2-12", fossil layers at 19-22" and 27-29".
	140									
							Smooth bedding-parallel fractures along siltstone laminae.			Approximate top of Pulaski Formation - Unit C at depth 145 ft (El. 149.8 ft).
150										
			C15	120/120	100	2 Avg.				C15: SILTSTONE AND SANDSTONE, soft, dark gray siltstone interbedded with light gray, medium sandstone. Layers of each type of rock are ~2-6" thick. Fresh rock, horizontal joints spaced 4-15".
	150						Clasts and lenses of siltstone, thin shale layers.			
140										
										Bottom of boring at depth 155.5 ft (El. 139.3 ft). Groundwater Monitoring well installed upon completion (screen interval: 120 ft to 140 ft). See separate Groundwater Well Installation Log for details.
							General Comments about Core Samples:			
	160						Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Ground Surface Elev. (ft): 295	Date Start / End: 8/29/2007 - 8/30/2007	**Final Boring Log**
Vertical Datum : NGVD 29	Total Depth (ft) : 155.5	Boring No. **B116(MW)**
		Page 5 of 5

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							sub-horizontal bedding-parallel fractures into account.			
130										
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	170						Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
120							Rock is hard, fresh, and unweathered unless otherwise noted.			
							Fracture surfaces are generally unweathered unless otherwise noted.			
	180									
110										
	190									
100										
	200									
90										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B116(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Stephen A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B117(MW)**

Boring Information

Northing : 1280280 **Easting :** 545532.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Rig Type/I.D: Mobile B57 / BL3

Date Start - End: 8/22/2007 - 8/27/2007
Driller Name: Kevin Frome
Logged By : E.Ringer, S.Mixan
Drilling Company : Boart Longyear
Total Depth (ft) : 184.5

Drilling Information

Hammer Ident: SN V
Auger I.D: 4.25 inch
Auger Head Length: 6 inch

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.1 ft

Drilling Method: 4.25-inch HSA to 2 ft. Drilled with roller bit to 4 ft, cored bedrock from 4 ft to 184.5 ft with NQ2 core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
			S1	15/24	5-15-20-54	NA	Auger refusal at 2 ft	S1: SILTY GRAVEL WITH SAND (GM); ~50% fine to coarse, angular gravel (gravel appeared to be fractured by sampler), ~30% fine to coarse sand, ~20% fines, slightly plastic. Gray/light brown. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 2 ft (El. 277.0 ft).
			C1	44/60	33	3 3 3 3 3	Bedding-parallel fractures with slight to moderate weathering.	C1: SANDSTONE, greenish-gray, hard, massive bedding, fine-grained, fresh. Irregular, near horizontal, slightly weathered fractures typically spaced at 3-6".
270	10		C2	61/66	85	3 3 3 3 3 NM		C2: SANDSTONE, greenish-gray, massive bedding, fine-grained, fresh, generally unfractured from 46-52" artificial drilling breaks.
			C3	109/120	96	NM NM NM NM NM 4 6 6 3 3	Thin shaly partings form bedding-parallel fractures. Clasts and lenses of siltstone in sandstone.	C3: SANDSTONE, greenish-gray, hard, massive, fine-grained, fresh, generally unfractured.
260	20							
			C4	118/120	91	NM	Shaly partings.	C4: SANDSTONE, greenish-gray, hard, massive, generally unfractured with 6 fractures from 25-32" with thin layers of silty shale.
250	30							

Fractures | Graphic Log

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/27/2007
Total Depth (ft) : 184.5

Boring No.
B117(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C5	120/120	87	NM NM NM 3 3 4 3 4 3 4	Slightly weathered fracture surfaces. Shaly partings. Siltstone layer from 40.3 to 40.5 ft			C5: SANDSTONE, greenish-gray, hard, generally massive with minor silty shale laminations, fine-grained, fresh, slightly weathered at joints, smooth to irregular, near-horizontal, slightly weathered fractures typically along contacts between sandstone and siltstone from 52-58" there are 6 fractures in an interbedded zone of sandstone and siltstone.
240	40									
			C6	120/120	90	3 2 2 2 2 2 2 2 2 2	Shaly partings.		C6: SANDSTONE, gray, hard with massive bedding, with minot silty shale laminations, fine-grained, generally fresh with slightly weathered fractures. Generally unfractured with 5 fractures from 90-101" in a zone of interbedded sandstone and silty shale, minor argillaceous clasts. Approximate top of Oswego Transition Zone at depth 50 ft (El. 229.0 ft).
230	50									
			C7	115/120	83	2 2 3 3 3 3 2 2 2 2	Shaly partings. Fractures along moderately-dipping siltstone bedding.		C7: SANDSTONE, greenish-gray, hard, generally massive, fine-grained, fresh, generally unfractured with 3 horizontal fractures from 48-61" at a silty shale zone, highly fractured argillaceous sandstone zone at 101-106", thin open fracture observed, minor interbedded argillaceous lamination.
220	60									
			C8	120/120	87	1 2 2 3 2 2 2 3 2 2	Distinct bedding and cross-bedding.		C8: SANDSTONE, gray, generally massive with minor interbedded massive with minor interbedded argillaceous laminations, fine-grained, fresh, generally unfractured with 12 fractures at 58-120", highly fractured zone of argillaceous sandstone at 59-61". highly fractured zone at 114-116".
210	70									
			C9	117/120	85	3 2	Bedding-parallel fractures.			C9: SANDSTONE, gray, greenish-gray, hard, generally massive with minor argillaceous laminations. Minor cross-bedding, fine-grained, fresh, generally unfractured, smooth, near horizontal, slightly weathered fractures typically spaced 6-18", interbedded with thick layers of argillaceous sandstone, layer of siltstone at 80-85".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/17/08

Final Boring Log

Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/27/2007
Total Depth (ft) : 184.5

Boring No.
B117(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2				
						2				
200						2				
						2				
	80					2				
						NM				
						NM				
						NM				
							Few fractures around siltstone clasts.			
			C10	117/120	77	2				C10: INTERBEDDED SANDSTONE AND ARGILLACEOUS SANDSTONE, greenish-gray to gray, hard, thickly bedded, fine-grained, fresh to slightly weathered, smooth and rough, near horizontal fractures typically spaced 8-18" apart with a highly fractured zone from 92-103", 4.5" shale layer at 98-102", interbedded minor, thin silty shale layers, fossils observed towards bottom of core.
						2				
						2				
						2				
						2				
190						2				
	90					3				
						3				
						2				Approximate top of Pulaski Formation - Unit A at depth 92.5 ft (El. 186.5 ft).
						2	6-inch-thick siltstone layer (marker bed).			
							Fossiliferous.			
			C11	120/120	95	2				C11: INTERBEDDED SANDSTONE AND ARGILLACEOUS SANDSTONE, gray and greenish-gray, hard, bedded, fine-grained, fresh, smooth and rough, slightly weathered fractures typically spaced 6-14", siltstone interbedded with argillaceous sandstone at 85-94", highly fossilized layer in bottom 2" of core.
						3				
						2				
						3				
						3				
180						3				
	100					3				
						3				
						3				
						NM				
			C12	120/120	98	2				C12: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SANDSTONE, hard, bedded, fine-grained, fresh, smooth, near horizontal slightly weathered fractures, fossils observed from 82-87".
						3				
						3				
						3				
						3				
170						2				
	110					3				
						2				
						3				
						3				
							Fossiliferous.			
			C13	118/120	95	2				C13: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SANDSTONE, hard, bedded, fine-grained, fresh, generally smooth, near-horizontal fractures in shale laminations, rough fractures in argillaceous clasts at 102".
						3				
						2				
						3				
						3				
160						2				
	120					2				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
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GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/27/2007
Total Depth (ft) : 184.5

Boring No.
B117(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2 2 2	Bedding-parallel fractures on occasional shale laminations.			
			C14	120/120	97	3 3 3 3 3 2 2 3 2 3				C14: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SANDSTONE AND SILTY SHALE, gray, some greenish-gray, bedded with minor shale laminations, fine-grained, fresh, generally unfractured. Fractures are horizontal, smooth and slightly weathered, spaced 0.5-12". Slightly fossiliferous.
150	130									
			C15	117/120	97	3 3 3 3 3 2 2 3 3 3				C15: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SANDSTONE, gray, bedded, fine-grained, fresh, fractures are near horizontal, generally smooth and fresh and are spaced 6-18". Approximate top of Pulaski Formation - Unit B at depth 138 ft (El. 141.0 ft).
140	140									
			C16	120/120	85	2 2 2 2 2 3 3 3 NM NM	Water bubbling out of hole. Fracture along dipping siltstone bedding plane. Natural gas pocket at 149.5 ft. Drill water forced out of top of drill casing.			C16: SILTSTONE INTERBEDDED WITH SANDSTONE, gray to dark gray, hard, fine-grained, fresh, mostly smooth planar, fresh fractures spaced 4-12". Highly fractured zone at 78-84", fossiliferous layers at 0-12" and 36-48", clasts present, inclined fracture at 96".
130	150									
			C17	120/120	73	2 3 2 2 3 2 2 3 2 2	Fractures along dipping siltstone bedding planes. Shaly partings. Highly fractured moderately weathered shale bed 160 to 161 ft.			C17: SANDSTONE INTERBEDDED WITH SHALE, gray to black, hard to medium, bedded, fresh, smooth to irregular, near horizontal, slightly to moderately weathered fractures typically spaced 0.5-4" in shale layers, interbedded with siltstone.
120	160									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Boring No. **B117(MW)**

Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/27/2007
Total Depth (ft) : 184.5

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C18	119/120	86	2 3 2 2 2 3 2 3 2 2				C18: INTERBEDDED SHALE AND SANDSTONE, gray to black, hard to medium, bedded, fresh, smooth, rough and irregular, near-horizontal slightly weathered fractures typically spaced 4-18" in shale and siltstone layers, interbedded with silty shale and siltstone.
110	170									
			C19	120/120	97	NM				C19: SANDSTONE, gray, hard, massive, fresh, fine to medium grained, well-sorted, generally unfractured, interbedded shale layers up to 6" thick, fossiliferous.
100	180						Fossiliferous siltstone.			Approximate top of Pulaski Formation - Unit C at depth 180.5 ft (El. 98.5 ft).
90	190						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			Bottom of boring at depth 184.5 ft (El. 94.5 ft). Groundwater Monitoring well installed upon completion (screen interval: 145 ft to 165 ft). See separate Groundwater Well Installation Log for details.
80	200						Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds. Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 279
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/27/2007
Total Depth (ft) : 184.5

Boring No.
B117(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted.			
70							Fracture surfaces are generally unweathered unless otherwise noted.			
	210									
60										
	220									
50										
	230									
40										
	240									
30										
	250									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 149.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B117(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Stutzbo Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph. L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenney Date: 4/8/08

Notes: A. Cummings verified locations of fractures

Form 150.3 rev. 1

Boring Information

Northing : 1279283.8 **Easting :** 545652.1
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 293.5
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 8/22/2007 - 8/28/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 205.5

Final Boring Log

Boring No.
B118(MW)

Drilling Information

Hammer Ident: SN III
Auger I.D: 4.25 inch
Auger Head Length: 3.25 inch
Casing I.D: NM
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 4.25-inch HSA to 10 ft, temp casing to top of rock. Cored bedrock with NQ2 core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	13/24	5-22-26-30	NA				S1: (0-6"): SILTY SAND WITH GRAVEL (SM); ~40% fine sand, ~40% non-plastic fines, ~20% fine to coarse gravel. Trace root fibers, light brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 0.5 ft (El. 293.0 ft).
290										S1: (6-10"): ROCK FRAGMENTS - fragments of Oswego Sandstone, light gray. (10-13"): SILTY SAND WITH GRAVEL (SM); Similar to 0-6 in. GLACIAL TILL.
			S2	24/24	10-29-35-36	NA				S2: (0-17"): SILTY SAND WITH GRAVEL (SM); 44% mostly fine to medium sand, 43% fines (LL = NV, PI = NP), 13% fine gravel. Light brown, with pink-/red-colored gravel. (Laboratory grain-size and Atterberg limit tests performed.) (17-24"): SILTY SAND WITH GRAVEL (SM), similar to (0-17") except with 30% fine to coarse gravel. GLACIAL TILL.
	10		S3	8/4	100/4	NA				S3: (0-6"): SILTY SAND (SM); Similar to 0-17 in of S2, light brown. (6-8"): ROCK FRAGMENTS; ~90% fragments of Oswego Sandstone (light gray), ~10% soil similar to 0-6 in of S3. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 10.3 ft (El. 283.2 ft).
			C1	63/63	59	3, 2.5, 2.5, 2, 2				C1: SANDSTONE, light gray, laminated, medium sandstone. Fresh rock, horizontal fractures spaced 1-12", some areas with cross-bedding (7-11", 21"), fracture surfaces show siltstone clasts.
280			C2	116/120	65	2 Avg.	Shaly partings, slightly weathered.			C2: SANDSTONE, light gray, medium, freshly weathered, fine-grained, well-sorted, horizontal fractures spaced 1-24", one inclined fracture (~20°) at 29" from top of core, some areas of cross-bedding (29"), some interbedded siltstone, some clasts of lighter gray sandstone within sandstone layers.
	20						Incipient, near-vertical fracture (~3 inches).			
270			C3	119/120	92	2, 2, 2, 2, 2, 2.5, 2.5, 3	Fresh rock, bedding-parallel fractures. Distinct bedding.			C3: SANDSTONE, similar to C2, finely laminated bedding with some mottled layers (50" and 69"), some lighter sandstone clasts.
	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 294
Vertical Datum : NGVD 29
Date Start / End: 8/22/2007 - 8/28/2007
Total Depth (ft) : 205.5

Boring No.
B118(MW)

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3				
260						2.5				
			C4	116/120	84	2.5				C4: SANDSTONE WITH SILTSTONE, light gray, medium, fresh rock, fine to medium-grained sandstone with interbedded siltstone beds and clasts, horizontal fractures spaced 1-15", some mottled layers, ~2" thick layers of soft siltstone at 78" from top of core.
						2.5				
						2.5				
						2.5				
						2.5	Siltstone lenses and clasts in sandstone.			
	40					3				
						2.5				
						3				
						2.5				
250						2.5				
							Lost ~60 gal of water			
			C5	119/120	81	2	Shaly partings.			C5: SANDSTONE, light gray, medium - soft, fresh rock sandstone with interbedded siltstone and argillaceous sandstone, horizontal joints spaced 0.5-24", mottled texture in some areas, band of greenish mineral at 57-58".
						3				Approximate top of Oswego Transition Zone at depth 50 ft (El. 243.5 ft).
						3				
						3				
						3				
	50					3				
						3				
						3				
						3				
						3				
240						3				
			C6	116/120	82	3				C6: SANDSTONE, light gray, medium - hard sandstone with interbedded medium argillaceous sandstone and soft siltstone, fresh rock throughout, horizontal fractures spaced 1-15".
						3				
						3				
						3				
						3				
	60					3.5				
						3.5				
						3				
						3				
230						2.5				
			C7	120/120	87	3				C7: SANDSTONE AND SHALE, light gray, medium sandstone with interbedded siltstone, similar to C6. Mottled texture at 109-112", 6" thick layers of dark gray, medium - soft shale at 114". Fresh rock.
						3				
						3				
						3				
						3				
	70					3				
						3				
						3.5				
						4				
220						4.5				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

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Boring No.
B118(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C8	120/120	80	3 3 3 3 3 2 2 2 3 3	6-inch-thick siltstone layer (marker bed). Shaly partings.			C8: SANDSTONE, similar to C6. 6" thick layer of dark gray, medium - soft, finely-bedded silty shale at 36", thick (~21") bed of light gray, hard, massive sandstone at 57". Mottled texture at 22", cross-bedding at 57". Approximate top of Pulaski Formation - Unit A at depth 80 ft (El. 213.5 ft).
210	80									
			C9	118/120	85	4 Avg.	Shaly partings. Near-vertical fracture in argillaceous sandstone.			C9: SANDSTONE WITH SILTSTONE, light gray, medium, laminated sandstone with interbedded siltstone and silty shale, mottled texture in some areas, fresh rock throughout.
200	90									
			C10	119/120	83	3 3 3 3.5 3 2.5 2.5 3 3 2.5	Rate of water loss decreased. Lenses and clasts of siltstone in sandstone.			C10: SANDSTONE, light gray, medium, laminated sandstone interbedded with dark gray, soft siltstone, mottled texture at 3.6" from top of core, fresh rock.
190	100									
			C11	118/120	93	3 3 3 3 3 3 3 3 4 4	Increased sandstone content with thicker siltstone beds.			C11: SANDSTONE, similar to C10, except thicker beds (~1-2" thick) of siltstone, and more mottled layers. Approximate top of Pulaski Formation - Unit B at depth 115.5 (El. 178.0 ft).
180	110									
			C12	120/120	73	2 2				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
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GEI Project Number: 07223

GEI Consultants

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Final Boring Log

Boring No.
B118(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 3 3 3 3 3.5 4 4				C12: SANDSTONE AND SILTSTONE, light gray, medium sandstone interbedded with dark gray, soft siltstone. Horizontal joints spaced 2-15", fresh rock throughout, soft siltstone clasts visible in a few layers.
	120									
170							Well-lithified fossil debris.			
			C13	119/120	86	2 2 2 3 3 3.5 4 4 4 4				C13: SANDSTONE AND SILTSTONE, Similar to C12, except fossils are present. Fossil layers at 20", 43" and 101" from top of core, fresh rock, horizontal fractures spaced 3-12".
	130						Well-lithified clastic hash.			
160										
			C14	116/120	86	3 Avg.				C14: SILTSTONE WITH SANDSTONE (0-72") Mostly dark gray, soft siltstone, with some mottled layers. (72-116") Light gray, medium sandstone with interbedded siltstone, beds are 2-12" thick. Horizontal fractures spaced 1-12", fresh rock throughout.
	140									
150										Approximate top of Pulaski Formation - Unit C at depth 145.5 ft (El. 148.0 ft).
			C15	119/120	73	2 3 2 2 2 3 3 3 3 3	Irregular fracture surfaces along clasts at contact of siltstone and sandstone.			C15: Dark gray/black, soft siltstone with interbedded light gray medium - hard sandstone. Some layers of mottled color, horizontal fractures spaced 3-12", fresh rock throughout.
	150									
140										
			C16	118/120	92	3 3 3 4 3				C16: SANDSTONE and SILTSTONE, light gray, medium sandstone and dark gray, soft siltstone interbedded. Sandstone layers are ~3-6" thick, siltstone layers are ~3-12" thick. Mottled texture between sandstone and siltstone layers, core is predominantly siltstone. Fresh rock, horizontal joints spaced 2-12".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
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Final Boring Log

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Boring No.
B118(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3				
						4				
						3				
						4				
130						5				
			C17	120/120	88	2.5				C17: SANDSTONE AND SILTSTONE, light gray, hard sandstone interbedded with dark gray, soft siltstone. Beds are ~8-24" thick, fresh rock, horizontal joints spaced 1-24".
						2.5				
						3				
						2.5				
						2.5				
	170					2	Shaly partings in siltstone.			
						4.5				
						3				
						3				
120						3.5				
										Approximate top of Whetstone Gulf Formation - Unit A at depth 175.5 ft (El. 118.0 ft).
			C18	119/120	91	3				C18: SILTSTONE (0-42") Light gray, hard sandstone. (42-119") Dark gray, soft siltstone and silty shale with some interbedded sandstone similar to 0-42" section.
						3				
						3				
						3	Fresh rock.			
						3				
	180					3				
						3	30° fracture in siltstone, clay-infilling (possible fault gouge material).			
						5				
						3				
110						4				
			C19	120/120	98	3				C19: SILTSTONE, dark gray, soft siltstone with 2 layers of interbedded medium, light gray sandstone (66-76" and 85-99"), fresh rock, horizontal joints spaced 3-18".
						3				
						3				
						3				
						3				
	190					3				
						3				
						3				
						3				
100						3				
			C20	120/120	95	3				C20: SILTSTONE AND SANDSTONE, dark gray, soft siltstone interbedded with large beds of light gray, medium - hard sandstone. Fresh rock, horizontal joints spaced 3-24".
						3				
						3				
						3				
						3				
	200					3				
						3				
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Ground Surface Elev. (ft): 294	Date Start / End: 8/22/2007 - 8/28/2007	**Final Boring Log**
Vertical Datum : NGVD 29	Total Depth (ft) : 205.5	Boring No. **B118(MW)**
		Page 6 of 6

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
90						3 3	Bedding-parallel fractures in siltstone.			
										Bottom of boring at depth 205.5 ft (El. 88.0 ft). Groundwater Monitoring well installed upon completion (screen interval: 180 ft to 200 ft). See separate Groundwater Well Installation Log for details.
							General Comments about Core Samples:			
	210						Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
80										
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
	220						Vertical fractures occasionally present in sandstone beds.			
70							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
							Rock is hard, fresh, and unweathered unless otherwise noted.			
	230						Fracture surfaces are generally unweathered unless otherwise noted.			
60										
	240									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.2 rev. 1

Final Boring Log Signature Page	Boring No. B118(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather R. Pitts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph. A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenz Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B119(MW)
Page 1 of 1

Boring Information

Northing : 1279282.6 **Easting :** 545639.9
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 293.5
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 8/28/2007 - 8/28/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 70.2

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 4 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

Drilling Method: HSA to 10.5 ft (refusal), replaced HSA with 6-inch casing, air hammer used to drill rock to 70.2 ft.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
290										Boring advanced to 70.2 ft without sampling.
	10									
280										
	20									
270										
	30									
260										
	40									
250										
	50									
240										
	60									
230										
	70									Bottom of boring at depth 70.2 ft (El. 223.3 ft). Groundwater Monitoring well installed upon completion (screen interval: 50 ft to 70 ft). See separate Groundwater Well Installation Log for details.
220										

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B119(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B120(MW)
Page 1 of 1

Boring Information

Northing : 1281137.8 **Easting :** 544051
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 267
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/16/2007 - 10/16/2007
Driller Name: Jay Stockholm
Logged By : Francisco Trejo
Drilling Company : Nothnagle
Total Depth (ft) : 14.5

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 6 inch
Drilling Method: 4.25-inch HSA from 0 ft to 14.5 ft.

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260	10									Boring advanced to 14.5 ft without sampling.
250	20									Bottom of boring at depth 14.5 ft (El. 252.5 ft). Groundwater Monitoring well installed upon completion (screen interval: 6 ft to 14.5 ft). See separate Groundwater Well Installation Log for details.
240	30									

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

Final Boring Log Signature Page	Boring No. B120(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Stephen A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B121(MW)
Page 1 of 1

Boring Information

Northing : 1280926.9 **Easting :** 543909.4
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 266.6
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/16/2007 - 10/16/2007
Driller Name: Jay Stockholm
Logged By : Francisco Trejo
Drilling Company : Nothnagle
Total Depth (ft) : 17.5

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 6 inch
Drilling Method: 4.25-inch HSA from 0 ft to 17.5 ft.

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260	10									Boring advanced to 17.5 ft without sampling.
250	20									Bottom of boring at depth 17.5 ft (El. 249.1 ft). Groundwater Monitoring well installed upon completion (screen interval: 6 ft to 17.5 ft). See separate Groundwater Well Installation Log for details.
240	30									

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B121(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Walter P. Shutak Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Eckert Date: 4/8/08

Rock Descriptions Checked by: Stephen A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kurz Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B122(MW)
Page 1 of 1

Boring Information

Northing : 1280694.8 **Easting :** 544110.8
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 282.5
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 10/15/2007 - 10/15/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 19.6

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 4 inch
Casing I.D: NM
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA
Drilling Method: HSA with plug (4" dia, 6" long) to top of rock (19.6 ft).

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
280										Boring advanced to 19.6 ft without sampling.
	10									
270										
	20									Bottom of boring at depth 19.6 ft (El. 262.9 ft). Groundwater Monitoring well installed upon completion (screen interval: 6 ft to 19 ft). See separate Groundwater Well Installation Log for details.
260										
	30									
250										

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

Final Boring Log Signature Page	Boring No. B122(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Gulato Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph. A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B123(MW)**

Boring Information

Northing : 1280883.9 **Easting :** 544313.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 272.1
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N1

Date Start - End: 10/16/2007 - 10/16/2007
Driller Name: Neal Short
Logged By : Heather Shields
Drilling Company : Nothnagle
Total Depth (ft) : 8.0

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 4 inch
Drilling Method: HSA with plug (4" dia, 6" long) to top of rock (8.0 ft).

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
270										Boring advanced to 8 ft without sampling.
	10									Bottom of boring at depth 8 ft (El. 264.2 ft). Groundwater Monitoring well installed upon completion (screen interval: 5.7 ft to 7.7 ft). See separate Groundwater Well Installation Log for details.
260										
	20									
250										
	30									
240										

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B123(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Charles P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B124(MW)
Page 1 of 1

Boring Information

Northing : 1280799.2 **Easting :** 543866.6
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 263.2
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/16/2007 - 10/16/2007
Driller Name: Jay Stockholm
Logged By : Francisco Trejo
Drilling Company : Nothnagle
Total Depth (ft) : 12.0

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: NM
Drilling Method: HSA from 0 ft to 12 ft.

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260										Boring advanced to 12 ft without sampling.
	10									
250										Bottom of boring at depth 12 ft (El. 251.3 ft). Groundwater Monitoring well installed upon completion (screen interval: 6.5 ft to 11.5 ft). See separate Groundwater Well Installation Log for details.
	20									
240										
	30									

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B124(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutes Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schaub Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B201(MW)**

Boring Information

Northing : 1280776.2 **Easting :** 543669.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 255.9
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 8/30/2007 - 9/11/2007
Driller Name: Jay Stockholm
Logged By : Curtis Lee
Drilling Company : Nothnagle
Total Depth (ft) : 200.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 2.5 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: HSA to 6 ft, replace HSA with 4-inch casing, cored bedrock with NQ2 wireline core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description / Rock-Lithological Description
			S1	10/24	3-9-24-25	NA				S1: SILTY SAND (SM); ~50% fine sand, ~40% slightly plastic fines, ~10% medium to coarse sand, roots, organic material, dark brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 1 ft (El. 254.9 ft).
			S2	5/24	15-21-25-20	NA				S2: (0-5") GRAVELLY SILT (ML); ~55% non-plastic fines, ~45% subangular coarse gravel up to 3/4". Rapid dilatancy, brown, slight amounts of organic material present up to 1/8". GLACIAL TILL.
			S3	14/24	13-28-37-50	NA				S3: (0-6") SILTY SAND (SM); ~60% mostly fine to medium sand, ~30% slightly plastic fines, ~10% fine gravel, light brown. (6-14") SILTY GRAVEL WITH SAND (GW-GM); ~45% fine to coarse gravel, ~35% fine sand, ~20% non-plastic fines. Gravels are angular-subangular, sands contain quartz, fines have rapid dilatancy. Appears to be fragments of Oswego Formation. GLACIAL TILL.
250			S4	7/7	22-101	NA				S4: SANDY SILT WITH GRAVEL (ML); ~50% slightly plastic fines, ~30% mostly fine sand, ~20% fine gravel, light brown. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 6.8 ft (El. 249.1 ft).
			C1	97/98	98	2				C1: SANDSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE, hard, slightly weathered, smooth, planar-40° angle joints with spacing that ranges from 1" - 13". Color is light greenish gray. Faces of joints are slightly weathered.
						2.5				
						2	Slightly weathered iron oxide staining on fracture surfaces.			
	10					2.5				
						2				
						2				
						2				
						NM				
240			C2	117/120	91	2				C2: SANDSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE. Hard, slightly weathered, smooth, planar-30° angle joints with spacing ranging from 1/2" -14", faces of joints show slight weathering, color varies from light greenish gray - medium gray. Argillaceous interbeds range from 1/2" - 4" throughout core run.
						2.5				
						2				
						2.5	Smooth bedding-parallel fractures.			
						3				
	20					2				
						2				
						2				
						2	Slightly weathered fractures.			
						2.5				
230			C3	120/120	83	3.5				C3: SANDSTONE WITH INTERBEDDED SILTSTONE, similar to C2. Joints are spaced 1/8" - 14" with joint faces ranging from planar - 20°. Faces of joints are slightly weathered.
						3.5				
						3				
						3	Shaley partings.			
						3.5				
	30					4	Shaley partings.			
						4				
						4				
						3.5				
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/11/2007
Total Depth (ft) : 200.0

Boring No.
B201(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures / Graphic Log	Soil-Sample Description Rock-Lithological Description
									Approximate top of Oswego Transition Zone at depth 36 ft (El. 219.9 ft).
220			C4	122/120	81	3.5, 3.5, 3, 4, 4, 4, 4, 3.5, 3, 3.5	Shaley partings.		C4: SANDSTONE WITH ARGILLACEOUS SANDSTONE AND INTERBEDDED SILTSTONE. Gray wacke, hard, slightly weathered, smooth, joint spacing ranges from 1/4" - 19.5" with joint faces ranging from planar - 20°. Faces of joints are slightly weathered, color varies from light greenish-gray - dark gray. Gray wacke present from 47"-50".
	40								
210			C5	119/120	73	3.5, 3.5, 4, 4, 4, 3.5, 3.5, 3.5, 4, 4	Lenses and clasts of siltstone in sandstone. Distinct crossbedding. Shaley partings.		C5: SANDSTONE WITH ARGILLACEOUS SANDSTONE AND INTERBEDDED GRAYWACKE. Similar to C4. Joint spacing ranges from 1/4" - 12" with faces planar - 40°, slight weathering on joint faces.
	50								
200			C6	118/120	93	3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5	Fracture along moderately-dipping siltstone bed. Thin shaley partings.		C6: SANDSTONE WITH ARGILLACEOUS SANDSTONE AND INTERBEDDED GRAYWACKE. Hard - medium, slightly weathered, smooth, joints are planar - 20° with joint spacing from 1/2" - 22", joint faces are slightly weathered, showing no replacement mineralization, color is light greenish-gray - dark gray.
	60								
190			C7	120/120	58	3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5, 3.5	Thin shaley partings.		C7: ARGILLACEOUS SANDSTONE WITH INTERBEDDED SANDSTONE AND SILTSTONE AND SHALE. Hard - medium, slightly weathered, smooth, planar - 10° joints with spacing 1/4" - 17", extremely fractured from 16" - 103", light - dark gray, shale present from 76" - 79".
	70								
180			C8	120/120	64	3.5, 3.5, 3.5, 3.5, 3.5, 3.5	Fractures along contacts of clasts.		C8: (0-89") ARGILLACEOUS SANDSTONE INTERBEDDED with SILTSTONE AND SANDSTONE. Medium, slightly weathered, smooth, planar - 60°, joints ranging from 1/2" - 7.5", extremely fractured from 0 - 17.5" and 38 - 60", light - dark gray. (89-120") ARGILLACEOUS SANDSTONE INTERBEDDED with SILTSTONE AND SANDSTONE, medium, slightly weathered, smooth, planar - 10° joints ranging from 2" - 12", fossiliferous layer present from 89" - 96", dark gray.
	80								Approximate top of Pulaski Formation - Unit A at depth 80.5 ft (El. 175.4 ft).

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/11/2007
Total Depth (ft) : 200.0

Boring No.
B201(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3.5	6-inch-thick siltstone layer (marker bed). Shaley partings.			
						3.5				
						3.5				
						3.5				
170			C9	119/120	72	3.5				C9: Similar to C8 (89" - 120"). Joints are planar - 10°, joints spacing ranges from 1/2" - 14.5", joint faces are slightly weathered. There is a two-inch fossiliferous layer from 63" - 65".
						3.5				
						3.5				
						3.5				
						3.5				
	90					3.5				
						3.5				
						3.5				
						3.5				
						3.5	Disturbed bedding (soft sediment deformation).			
160			C10	121/120	96	3.5				C10: Similar to C9. Joints are planar - 20°, joint spacing ranges from 2" - 12.5", with slight weathering on joint faces. There is a fossiliferous layer from 12" - 15" containing shell fragments embedded in siltstone. A portion of this core (97.08 ft - 97.45 ft) was analyzed petrographically.
						3.5				
						3.5				
						3.5				
						3.5				
	100					3.5				
						3.5				
						3.5				
						3.5				
						3.5				
										Approximate top of Pulaski Formation - Unit B at depth 105 ft (El. 150.9 ft).
150			C11	118/120	82	3.5				C11: ARGILLACEOUS SANDSTONE WITH INTERBEDDED SILTSTONE, SHALE AND SANDSTONE. Medium, slightly weathered, smooth, planar - 10° joint faces with spacing ranging from 2" - 11". Color varies from light - dark gray. There is a green layer 1/2" thick from 7.5" - 8". Thought to be a chlorite enriched zone. Shale present from 84.5" - 84" and 60" - 60.25". Trace fossils present from 15" - 22". Graywacke interbedded present in argillaceous sandstone throughout sample.
						4				
						5.5				
						4				
						3.5				
	110					3				
						3.5				
						3.5	Shaley partings.			
						3.5				
						3.5				
140			C12	120/120	91	3.5				C12: (0-72") Similar to C11 (8" - 118"). Joints are planar - 10° with joint spacing ranging from 2" - 14", faces of joints are slightly weathered. Shale bedding present 63.5" - 64". (72" - 120") FOSSILIFEROUS SANDSTONE with INTERBEDDED SANDSTONE and SILTSTONE. Medium, slightly weathered, smooth joint spacing ranges from 2" - 14.5", faces of joints are planar - 10°, showing slight weathering, light - dark gray, fossils present 72" - 90".
						3.5				
						3.5				
						3.5				
	120					3.5				
						3.5				
						3.5	Natural gas pocket at 121 ft. Drill water forced out of top of casing, measured gas level at 15% LEL, water bubbling at top of drill casing into next day.			
						3.5				C13: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE, SILTSTONE AND SHALE. Hard - medium, smooth, slight weathering, joint spacing ranges from 1.5" - 14", joint faces are planar - 10°, showing slight weathering, shale present from 110" - 113".
						3.5				
130			C13	120/120	84	3.5				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/11/2007
Total Depth (ft) : 200.0

Boring No.
B201(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3.5				
						3.5				
						3.5				
						3.5				
	130					3.5				
						3.5	Shaley partings - 3 inches.			
						3.5	Fractures along wavy bedding planes.			
						3.5				
						3.5				
120			C14	120/120	75	4				C14: (0-20"): INTERBEDDED SANDSTONE, SILTSTONE AND SHALE. Medium, slightly weathered, smooth, joint spacing ranges from 1/8" - 11", joints are planar - 10°, showings slight weathering, color is dark gray with sporadic light gray areas, shale present from 12.5" - 13". (20" - 120"): SILTSTONE with INTERBEDDED SHALE AND SANDSTONE, medium, slightly weathered, smooth, joint spacing ranges from 1/8" - 14", joints are planar - 10°, showing slight weathering, color is dark gray - black, sandstone clasts present throughout sample. Shale present 28.5" - 29.5" and 39.5" - 40".
						4				
						4				
						4				
						3.5	Shaley partings.			
	140					4				
						4				
						4				
						4				
						4				Approximate top of Pulaski Formation - Unit C at depth 145 ft (El. 110.9 ft).
110			C15	122/120	84	4	Sandstone clasts in siltstone.			C15: Similar to C14 (20" - 120"). Joint spacing ranges from 1/8" - 12.5", faces of joints are planar - 40°, with slight - moderate weathering. Heavily fractured zone from 41" - 44" with fossil remnants from 41" - 47".
						4				
						4				
						4				
						4				
	150					4				
						4				
						4				
						4				
						4				
100			C16	120/120	79	4				C16: Similar to C15, joints are 1" - 22.5", faces are planar - 20°, moderately fractured from 88" - 113", faces of joints are slightly weathered.
						4				
						4				
						4				
						3.5	Fossiliferous.			
	160					3.5				
						4				
						4				
						4				
						4				
90			C17	120/120	92	4	Shaley partings.			C17: Similar to C16, joint spacing ranges 0.75" - 28" with joint faces ranging from planar - 10°, showing slight weathering. Gray wacke interbeds present 3" - 5", 19" - 21", 110" - 113".
						4				
						4				
						4				
						4				
	170					4				
						4				
						4				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/11/2007
Total Depth (ft) : 200.0

Boring No.
B201(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4 4				C18: ALTERNATING SANDSTONE and SILTSTONE BEDDING, hard, medium, slightly weathered, smooth, planar - 10° joints, joint spacing is typically 1.5" - 17.25", bedding is massive with sandstone from 0 - 45", showing slight siltstone interbedding, siltstone from 45" - 107", light - dark gray.
80			C18	107/108	91	4 3 3 3 3 3 3 3 3	Distinct bedding.			Approximate top of Whetstone Gulf Formation - Unit A at depth 178 ft (El. 77.9 ft).
	180									
			C19	120/120	92	3 3 3 3 3 3 3 3 3 3				C19: Similar to C18, joints are planar - 10° with spacing typically 2" - 21.5", faces of joints are slightly weathered, sample is dominated by siltstone with small sandstone beds ranging from 2" - 7", abruptly changing back to siltstone, light - dark gray. A portion of this core (188.2 ft - 188.75 ft) was analyzed petrographically.
70										
	190									
			C20	65/72	55	3 3 3 3 3 3	Shaley partings. Fossiliferous.			C20: (0-52") Similar to C19, joints are planar - 10° with joints spacing ranging from 1" - 9.5", heavily fractured throughout entire sample. (52" - 65") SANDSTONE with INTERBEDDED SILTSTONE, hard, slightly weathered, smooth, planar joints up to 8.5", fossiliferous layer throughout sample, gray.
60										
	200									Bottom of boring at depth 200 ft (El. 55.9 ft). Groundwater Monitoring well installed upon completion (screen interval: 114.8 ft to 135 ft). See separate Groundwater Well Installation Log for details.
50							General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
	210						Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds.			
40										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 256
Vertical Datum : NGVD 29
Date Start / End: 8/30/2007 - 9/11/2007
Total Depth (ft) : 200.0

Boring No.
B201(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
	220						Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
30										
	230									
20										
	240									
10										
	250									
0										
	260									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.
Natural gas pocket at 121 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B201(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Matthew P. Shutsko Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Hugh A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. King Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B202(MW)
Page 1 of 1

Boring Information

Northing : 1280779.1 **Easting :** 543673.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 256.2
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/11/2007 - 9/11/2007
Driller Name: Jay Stockholm
Logged By : Curtis Lee
Drilling Company : Nothnagle
Total Depth (ft) : 31.0

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 2.5 inch
Drilling Method: Rotary wash drilling to 31 ft.

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
250	10									Boring advanced to 31 ft without sampling.
240	20									
230	30									
220										Bottom of boring at depth 31 ft (El. 225.2 ft). Groundwater Monitoring well installed upon completion (screen interval: 19.8 ft to 30 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.1 rev. 1

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B202(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pott Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenny Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B203**

Boring Information

Northing : 1280824.6 **Easting :** 543738.8
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 257.2
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/12/2007 - 9/18/2007
Driller Name: Jay Stockholm
Logged By : C. Lee, E. Ringer
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: NM

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: HSA 0-6.7 ft, cored rock 6.7-150 ft with NQ2 core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	19/24	3-5-7-10	NA				S1: (0-7"): SANDY SILT(ML); ~60% low plasticity fines, ~40% mostly fine to medium sand, sample contains roots and organics. (12-19"): NARROWLY GRADED SAND WITH SILT (SP-SM); ~90% fine sand, ~10% non-plastic fines, yellow. SURFICIAL DEPOSITS.
			S2	9/24	5-6-11-9	NA				S2: Similar to S1 (7-19"). SURFICIAL DEPOSITS.
			S3	16/24	4-6-7-10	NA				S3: SANDY LEAN CLAY (CL); ~60% low plasticity fines, slow dilatancy, ~40% mostly fine to medium sand, brown. SURFICIAL DEPOSITS.
			S4	9/9	9-10-100/3"	NA				S4: Similar to S1 (12-19"). Sample contains sandstone fragments up to 3/4". Contains organics, roots ~1/8-1/4" in diameter. SURFICIAL DEPOSITS.
250			C1	105/104	84	4.5				Approximate top of Oswego Sandstone at depth 6.7 ft (El. 250.5 ft).
						3	Slightly weathered.			C1: SANDSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE AND SILTSTONE LENSES. Hard, slightly weathered joints range from 0.5" - 18", faces of joints are planar - 10° with slight weathering on joint faces. There are siltstone lenses from 81" - 83", light greenish gray.
						3				
	10					3				
						3				
						3				
						3				
						3				
						NM				
			C2	116/120	82	3				C2: Similar to C1, siltstone present 76" - 81", 8.5" - 10", 45" - 47". Joint spacing ranges from 0.5" - 26.5", with joint faces ranging from planar - 10°, sample shows slight weathering with slight weathering apparent on joint faces.
						3				
240						3				
						3	Shaley partings.			
						3				
	20					3				
						3				
						3				
						3	Shaley partings.			
						3				
			C3	117/120	80	3				C3: ARGILLACEOUS SANDSTONE WITH SANDSTONE AND INTERBEDDED SILTSTONE, hard - medium, slight weathering, joint spacing ranges from 0.5" - 33.5", joint faces are planar - 10° with slight weathering. Argillaceous sandstone with siltstone interbeds present from 10" - 41", 51" - 53", 78.5" - 79.5", 81.5" - 82.5". Massive sandstone present from 93.5" - 140". Sample is light - dark gray.
						3	Bedding-parallel fractures along siltstone laminae.			
230						3				
						3				
						3				
	30					3				
						3				
						3				
						3				
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 257
Vertical Datum : NGVD 29
Date Start / End: 9/12/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B203

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
220	40		C4	120/120	100	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	Distinct bedding in sandstone.			C4: Similar to C3 (0 - 93.5"), siltstone beds present 2" - 10", 25" - 29", joints are spaced 4" - 40", joint faces are planar - 40° with fresh - slight weathering. 40° fracture present at 111"
210	50		C5	118/120	94	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	Fracture along moderately dipping siltstone/sandstone contact. Shaley partings. Lenses and clasts of siltstone.			C5: (0 - 23") Similar to C4. Joint spacing ranging from 6" - 17", joint faces are showing slight weathering , sample as a whole is slightly weathered. (24" - 118") INTERBEDDED ARGILLACEOUS SANDSTONE AND SILTSTONE, medium, slightly weathered, smooth, planar - 10° joints, joints are spaced 0.5" - 23.5", dark gray siltstone present from 24" - 36", siltstone also present from 4.5" - 43", color is light - dark gray.
200	60		C6	119/120	96	3 3 3 3 3 3 3 3 3 3	Fracture along moderately-dipping bedding plane.			C6: Similar to C5 (24" - 118"), less siltstone than previous sample, siltstone present from 35.5" - 36.5", 60.5" - 68.5", 88.5" - 92.5", 101" - 105", 115" - 116". Siltstone clasts in sandstone, bedding present 42" - 52", joints are planar - 40° (42.5"), joint spacing ranges from 0.5" - 27.5", joints are slightly weathered. Approximate top of Oswego Transition Zone at depth 60.5 ft (El. 196.7 ft).
190	70		C7	119/120	92	3 3 3 3 3 3 3 3 3 3				C7: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE, dark gray, hard, fine-grained, fresh, bedded, smooth, planar, fresh fractures spaced 3-12" apart, clasts, fossil bed from 62" - 63".
180	80		C8	120/120	80	3 3 4 4 4 4	Clasts of siltstone in argillaceous sandstone.			C8: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, dark gray, hard, fine grained, bedded, fresh, many clasts 5-12" and 27-30", highly fractured shale bed 56-60", fossiliferous from 90-120".

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 257
Vertical Datum : NGVD 29
Date Start / End: 9/12/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B203

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						4	Shaley partings.			
						4				
						4				
						4				
										Approximate top of Pulaski Formation - Unit A at depth 85.5 ft (El. 171.7 ft).
			C9	121/120	93	3	Trace fossils.			
						3				C9: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray, medium to hard, fine grained, fresh, fractures spaced 0.5" to 27", smooth, planar, highly fractured shale bed 34-35", fossiliferous from 66 - 69" and 83 - 86", sandstone 46 - 53" and 56 - 66".
170						3				
						3				
						3				
						3				
	90					3	Disrupted bedding (soft sediment deformation).			
						3				
						3				
						3				
						3				
			C10	121/120	93	3				C10: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE AND SILTSTONE, hard, gray to black, fine grained, fresh, bedded. Smooth, fresh, planar fractures spaced 4-24" apart. 0-27" mottled/fossiliferous argillaceous sandstone layer.
						3				
160						3				
						3				
						3				
	100					3				
						3				
						3				
						3				
						3				
							Distinct green mineral layer (marker bed).			Approximate top of Pulaski Formation - Unit B at depth 105.5 ft (El. 151.7 ft).
			C11	61/62	92	3	Moderately-dipping fractures in green layer.			C11: SILTSTONE INTERBEDDED WITH SHALE AND SANDSTONE, gray - dark gray, hard, fine grained, fresh, smooth and rough, fresh planar fractures spaced 1-12" apart, green layer from 6-8", green layer is roughly fractured with striations, bedded.
						3	Dip-slip slickensides.			
150						3				
						3				
						3				
	110									
			C12	58/58	95	3				C12: Similar to C11, fractures spaced 3-18", generally planar, bedded.
						3				
						3				
						3				
						3				
			C13	118/120	91	3				C13: SILTSTONE INTERBEDDED WITH SANDSTONE, hard, dark gray, fine grained, fresh, smooth, planar, fresh fractures spaced 4-12" apart, bedded, fossiliferous sandstone beds 66" - 120".
						3				
140						3				
						3				
						3				
	120					3				
						3				
						3				
						3				C14: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray to dark gray, hard, bedded, fine grained. Generally smooth, fresh, planar fractures spaced 2-10" apart, vertical fracture in sandstone bed from 96" - 100". First 5 ft more similar to C13, 5-10 ft less mottled with increased sandstone bed size. More frequent fractures at shale/sandstone contacts, fissile.
			C14	121/120	79	3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 257
Vertical Datum : NGVD 29
Date Start / End: 9/12/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B203

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
130						3				
						3				
						3				
						3				
	130					3				
						3				
						3	Incipient fracture with calcite infilling			
						3				
						3	Near vertical fracture in sandstone - 6 inches. Shaley partings.			
			C15	117/120	82	3.5				Approximate top of Pulaski Formation - Unit C at depth 135 ft (El. 122.2 ft). C15: SILTSTONE INTERBEDDED WITH SHALE AND SANDSTONE, gray to dark gray, medium to hard, fine grained, fresh, bedded, smooth planar fresh fractures spaced 2-12" apart except for a highly fractured fissile zone at 4-5" (4 fractures) and at 51-55" (6 fractures).
						3.5				
120						3.5				
						3.5				
						3.5	Shaley partings.			
						3.5				
	140					3.5				
						3.5				
						3.5				
						3.5				
						3.5				
			C16	57/60	88	3.5	Disrupted bedding (soft sediment deformation).			C16: Similar to C15, with no highly fractured zones, fractures spaced 1-12" apart.
						3.5				
110						3.5				
						3.5				
						3.5				
	150									Bottom of boring at depth 150 ft (El. 107.2 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
100							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
90										
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170									
							Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 257
Vertical Datum : NGVD 29
Date Start / End: 9/12/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B203

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
80										
	180									
70										
	190									
60										
	200									
50										
	210									
40										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Form 150.2 rev. 1

Final Boring Log Signature Page	Boring No. B203

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutes Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kenney Date: 4/8/08

Notes: A. Cummings verified locations of fractures

Form 150.3 rev. 1

Final Boring Log

Boring No. **B204**

Boring Information

Northing : 1280695.3 **Easting :** 543724.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 259.8
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/26/2007 - 10/1/2007
Driller Name: Jay Stockholm
Logged By : S. Sarandis, C. Lee
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 3.5 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: 4.25-inch HSA to 8.8 ft, pull auger place 6-inch casing, core with NQ core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
			S1	6/24	3-7-8-14	NA		S1: SILTY SAND (SM); ~50% fine sand, ~15% medium to coarse sand, ~35% low plasticity fines, organic matter, root fibers. Dark brown. SURFICIAL DEPOSITS.
								Approximate top of Glacial Till at depth 3.5 ft (El. 256.3 ft).
			S2	21/24	11-23-25-38	NA		S2: SILTY SAND (SM); ~40% fine sand, ~10% medium to coarse sand, ~10% fine gravel, ~40% slightly plastic fines. GLACIAL TILL.
							Auger grinding on cobbles below 7 ft.	C1: Recovered piece of Oswego Sandstone (possible cobble). Silt coating on the sandstone.
250	10		C1	1/24	0	1 1	Slight to moderate weathering.	S3: SILTY SAND WITH GRAVEL (SM); ~30% fine sand, ~15% medium to coarse sand, ~15% fine gravel, ~40% slightly plastic fines. Pockets of weathered sandstone. GLACIAL TILL.
			S3	7/7	55-100/1"	NA		Approximate top of Oswego Sandstone at depth 11.5 ft (El. 248.3 ft).
			C2	44/48	89	2 2 1 1		C2: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced at 1" to 29".
			C3	117/120	82	2 5 3 2 5 2 2 2 2 2	Shaley partings. Shaley partings.	C3: SANDSTONE, similar to C2 with highly fractured zones from 17.5 - 19.5 ft
240	20							
			C4	118/120	85	2 2 3 2 2 3 3 3 2 2	Massive to distinct bedding. Shaley partings. Shaley partings.	C4: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced at 1" to 24", two highly fractured zones with moderate weathering at 28.3 ft and 31.3 ft.
230	30							

Fractures | Graphic Log

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 9/26/2007 - 10/1/2007
Total Depth (ft) : 150.0

Boring No.
B204

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C5	119/120	89	NM NM NM NM NM 3 3 2 2 3	Shaley partings in siltstone. Inclined fracture along moderately-dipping siltstone lamination. Irregular fracture surfaces around clasts.			C5: SANDSTONE, similar to C4, one fracture dipping at 45°, one highly fractured zone at 42 ft.
220	40									
			C6	121/120	93	3 2 2 2 2 3 6 2 2 3	Shaley parting in siltstone.			C6: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced at 1" to 22". One 10" layer of siltstone/shale at a depth of 52 ft, layer is soft and highly fractured.
210	50									
			C7	120/120	93	2 2 2 2 2 2 2 3 2 2	Distinct bedding.		C7: SANDSTONE, gray, hard, cross-bedded, fine grained, slightly weathered, horizontal fractures spaced at 0.5" to 45", thin interbedded siltstone layers.
200	60									
			C8	120/120	93	2 2 2 3 3 2 2 2 2 3	Cross bedding. Siltstone clasts in sandstone.			C8: (0-42") SANDSTONE, similar to C7. (42"-120") SANDSTONE WITH INTERBEDDED SILTSTONE, gray and dark gray, hard, bedded, fine grained, horizontal fractures spaced 1" to 16". Approximate top of Oswego Transition Zone at depth 70.5 ft (El. 189.3 ft).
190	70									
			C9	119/120	87	3 3 2 3 3				C9: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, similar to C8 (42"-120").
180	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 9/26/2007 - 10/1/2007
Total Depth (ft) : 150.0

Boring No.
B204

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 3 2 3 3	Lenses and stringers of siltstone.			
			C10	120/120	98	3 2 3 3 3	6-inch-thick siltstone layer (marker bed).			Approximate top of Pulaski Formation - Unit A at depth 87.5 ft (El. 172.3 ft).
170	90					NM NM NM NM NM	Well-lithified marine fossil debris. Disrupted bedding (soft sediment deformation).			C10: (0-17") Similar to C9 (17-120") ARGILLACEOUS SANDSTONE INTERBEDDED WITH SHALE AND SILTSTONE, dark gray, hard, bedded, fine-grained, slightly weathered, horizontal fractures, spaced at 4" to 24", zones of convoluted bedding with fossil debris.
160	100		C11	119/120	94	2 Avg.				C11: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, similar to C10 (17-120")
150	110		C12	120/120	89	2 2 3 2 2 3 2 2 3 2	2-inch-thick distinctive green mineral layer (marker bed).			C12: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SANDSTONE, gray and dark gray, hard, bedded, fine grained, horizontal fractures spaced at 1" to 22". A 2.5" thick layer of green mineral at a depth of 110.1 ft. Approximate top of Pulaski Formation - Unit B at depth 110.5 ft (El. 149.3 ft).
140	120		C13	120/120	95	2 2 3 3 3 3 3 3 3 3	Disrupted bedding (soft sediment deformation).			C13: SILTSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE AND SANDSTONE, hard, finely bedded, fine grained, horizontal fractures spaced from 2.5" to 36", color is gray - dark gray.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 9/26/2007 - 10/1/2007
Total Depth (ft) : 150.0

Boring No.
B204

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C14	115/120	100	2	Quartz vugs.			C14: Similar to C13, joint spacing ranges from 5.5" - 27", joint faces are horizontal - 10°, rock is slightly weathered, there are fossiliferous interbeds (~2-3") at 127 - 128.5 ft.
						2				
						2				
						3				
130	130					2	Fossiliferous.			
						2				
						2				
						2				
						2				
						2				
			C15	120/120	84	2				C15: Similar to C13, joint spacing ranges from 0.25" - 21", with joint faces ranging from planar - 30°, there is a lack of fossils and bedding is abrupt.
						2				
						2	Shaley partings.			
						3				
120	140					3	2-inch-long near-vertical fracture in siltstone.			
						2				
						2				
						2				
						2	Moderately-dipping dip-slip slickenside.			
						2				
							1-inch-long near vertical fracture in siltstone slickensides.			Approximate top of Pulaski Formation - Unit C at depth 146.5 ft (El. 113.3 ft).
			C16	52/48	92	NM	Quartz vugs.			C16: Similar to C13, joint spacing ranges from 0.5" - 13.5" with joint faces planar - 10°. Less sandstone in sample.
							Shaley partings.			
							Sandstone clasts in siltstone.			
110	150									Bottom of boring at depth 150 ft (El. 109.8 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
100	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
90	170									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 260
Vertical Datum : NGVD 29
Date Start / End: 9/26/2007 - 10/1/2007
Total Depth (ft) : 150.0

Boring No.
B204

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
80	180									
70	190									
60	200									
50	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B204

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schuster Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B205**

Boring Information

Northing : 1280754.1 **Easting :** 543806.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 261.1
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/24/2007 - 9/26/2007
Driller Name: Jay Stockholm
Logged By : Steve Sarandis
Drilling Company : Nothnagle
Total Depth (ft) : 151.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 3.5 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: 4.25-inch ID HSA to top of rock, pull augers install 6-inch casing to top of rock, core with NQ barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description / Rock-Lithological Description
260		X	S1	7/24	2-4-11-19	NA				S1: (0-6") SILTY SAND (SM); ~70% fine to medium sand, ~30% low plasticity fines. Organic matter, root fibers, dark brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 0.5 ft (El. 260.7 ft).
		X	S2	16/24	8-18-22-29	NA				S1: (6-7") SILTY SAND WITH GRAVEL (SM); ~60% fine sand, ~25% slightly plastic fines, ~15% fine gravel; tan. GLACIAL TILL. S2: SILTY SAND WITH GRAVEL (SM); Similar to S1 (6-7") with zones of fine to medium sand with <5% fines, zones ~1/2" thick. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 8.5 ft (El. 252.7 ft).
250	10		C1	58/60	85	2 2 3 4 3				C1: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, smooth, planar horizontal fractures spaced at 3"-12".
			C2	24/30	63	3 5 NM	Shaley partings. Iron oxide on fracture surface, moderate weathering.			C2: SANDSTONE, similar to C1.
240	20		C3	117/120	93	2 2 2 2 2 2 2 3 2 2	Calcite on fracture surface. Distinct bedding. Rough fracture surfaces in sandstone.			C3: SANDSTONE, gray, hard, bedded, fine grained, fractures spaced at 1" to 14", fractures range from horizontal to dipping 15° from vertical, slightly weathered.
230	30		C4	120/120	77	2 2 3 3 3 2 3 3 2 3				C4: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, occasional layers of shale/siltstone up to 1.5" thick, planar horizontal fractures spaced at 0.5" to 18", highly fractured zones at 7.5-8.5 ft and 5.5-6.2 ft from top of core.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/24/2007 - 9/26/2007
Total Depth (ft) : 151.0

Boring No.
B205

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Shaley partings.			
			C5	120/120	90	2 2 3 3 4 2 2 3 2 3	Shaley partings. Inclined fracture along moderately-dipping bedding plane.			C5: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, isolated layer/pocket of siltstone, planar horizontal joints spaced 1" to 15".
220	40									
			C6	120/120	90	2 2 2 3 2 4 2 2 2 2	Shaley partings.			C6: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, planar horizontal fractures spaced from 3" to 46", one layer of shale about 6" that is highly fractured.
210	50									
			C7	120/120	97	3 3 2 5 2 3 2 2 3 3	Interbedded thin siltstone laminae.			C7: SANDSTONE, similar to C6 with occasional siltstone layers.
200	60									
			C8	119/120	96	2 2 2 1 1 3 4 3 3 2	Massive sandstone. Siltstone clasts.			C8: (0-64") SANDSTONE, similar to C6. (64"-119") SANDSTONE, interbedded with siltstone, gray with dark gray layers, hard, bedded, fine grained, slightly weathered, planar horizontal fractures spaced at 3" to 18". Approximate top of Oswego Transition Zone at depth 70.5 ft (El. 190.7 ft).
190	70									
			C9	118/120	94	3 3 3 3 3				C9: SANDSTONE, similar to C8 (64"-119") with some silt coatings on joint surfaces, one open joint with fractured rock infill.
	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/24/2007 - 9/26/2007
Total Depth (ft) : 151.0

Boring No. **B205**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
180						2 3 2 2 4	6-inch-thick siltstone layer (marker bed). Rough fracture surfaces in sandstone. Clasts and lenses. Trace fossils.			
			C10	120/120	90	2 3 2 2 1 3 3 2 2 2	Well-lithified marine fossil debris. Disrupted bedding (soft sediment deformation).			Approximate top of Pulaski Formation - Unit A at depth 88 ft (El. 173.2 ft). C10: (0-24") SANDSTONE, similar to C8 (64"-119") (24"-119") SANDSTONE, gray, hard, bedded with zones of convoluted bedding, fine grained, planar horizontal fractures spaced at 3" to 30", occasional layers of shale and siltstone, fossil debris.
90 / 170										
			C11	120/120	97	3 3 3 3 2 2 2 2 2				C11: SANDSTONE, similar to C10 (24-119").
100 / 160										
			C12	119/120	93	2 2 3 3 2 4 2 4 3 3	Distinct green mineral layer (marker bed). oh			C12: (0-110") SANDSTONE, similar to C11 with 2.5" thick green mineral layer at 4 ft 8 inches - green mineral layer has dark gray lines. (110"-119") SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced at 1" to 5", interbedded layers of shale. Approximate top of Pulaski Formation - Unit B at depth 110 ft (El. 151.2 ft).
110 / 150										
			C13	121/120	96	2 2 2 3 3 3 2 2 2 3				C13: SANDSTONE WITH INTERBEDDED SILTSTONE AND SHALE, gray and dark gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced 3" to 69", some fracture surfaces have silt coatings, zones of convoluted bedding.
120 / 140										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/24/2007 - 9/26/2007
Total Depth (ft) : 151.0

Boring No.
B205

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C14	118/120	88	2	Clasts and lenses with disrupted bedding (soft sediment deformation).			C14: FOSSILIFEROUS SANDSTONE WITH INTERBEDDED SILTSTONE SHALE AND GRAY WACKE LAYERS, gray to dark gray, hard, bedded, fine grained, slightly weathered, planar horizontal fractures spaced 3" to 24".
						2				
						2				
						2				
	130					3				
130						3	Incipient vertical fractures in sandstone with calcite infill. Fossiliferous sandstone.			
						2				
						2				
						3				C15: (0-65") SANDSTONE INTERBEDDED WITH SHALE, gray, dark gray, hard, bedded, fine grained, slightly weathered, horizontal fractures spaced at 3" to 24", two highly fractured shale layers about 3" thick - one at about 137 ft and one at about 139.5 ft. (65"-121") SILTSTONE INTERBEDDED WITH SHALE AND SANDSTONE, dark gray, medium, laminated, fine grained, fractures spaced at 1" to 24", one highly fractured shale layer at 141.5 ft.
						4				
			C15	121/120	88	3	Shaley partings.			
						2	Disrupted bedding (soft sediment deformation).			
						3				
						2	Shaley partings.			
	140					3				Approximate top of Pulaski Formation - Unit C at depth 140.5 ft (El. 120.7 ft).
120						3				
						3				
						2				
						4				
						6				
			C16	55/60	90	3				C16: Similar to C15 (65"-121"), with planar horizontal fractures spaced at 1" to 17".
						3				
						3				
						3				
	150					3				
110										Bottom of boring at depth 151 ft (El. 110.2 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
	160									
100										
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/24/2007 - 9/26/2007
Total Depth (ft) : 151.0

Boring No.
B205

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Rock is hard, fresh, and unweathered unless otherwise noted.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B205

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Shaw Date: 4/8/08

Rock Descriptions Checked by: Hugh L. Orr Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kennedy Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B206**

Boring Information

Northing : 1280860.5 **Easting :** 543825.2
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 260.5
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/17/2007 - 9/18/2007
Driller Name: Jay Stockholm
Logged By : Curtis Lee
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 2.5 inch
Drilling Method: HSA to 5 ft, core bedrock with NQ core barrel.

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260			S1	14/24	3-4-7-11	NA				S1: (0-7"): SANDY LEAN CLAY (CL); Moist, ~50% low plasticity fines, slow dilatancy, ~45% fine sand, ~5% fine subangular gravel up to 1/2". Dark brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 0.5 ft (El. 260.0 ft).
			S2	11/24	19-29-40-33	NA				S1: (7-14"): CLAYEY SAND WITH GRAVEL (SC); moist, ~45% fine sand, ~30% fine subangular gravel up to 1/2", ~25% fines, organics present, roots up to 1/4" in top 6", light yellowish brown. GLACIAL TILL. S2: (0-9"): Similar to S1 (7-14") GLACIAL TILL. (9-11"): Rock fragments, thought to be pieces of Oswego sandstone.
			S3	21/24	17-34-38-46	NA				S3: CLAYEY SAND WITH GRAVEL (SC); ~55% mostly fine to medium sand, ~30% low plasticity fines, ~15% fine subangular gravel, dense structure, yellow-brown. GLACIAL TILL.
			S4	20/24	36-30-44-100/3"	NA				S4: Similar to S3; Fragments of Oswego Sandstone present in top 3" of sample. Color change yellowish brown. GLACIAL TILL.
			S5	7/7	39-100/1"	NA				S5: Similar to S3. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 8.9 ft (El. 251.6 ft).
250	10		C1	73/78	76	3, 3.5, 3, 3, 3.5, 3, 1.5	Shaley partings. Iron oxide on fracture surfaces - moderate weathering.			C1: SANDSTONE WITH INTERBEDDED ARGILLACEOUS SANDSTONE, hard, slightly weathered, planar joints dipping up to 10° from horizontal, joints spaced from 0.5" - 17", top 20" is heavily fractured, light green-gray.
240	20		C2	112/114	94	3, 3, 3, 2.5, 2.5, 3, 2.5, 2.5, 3	2-inch-long near vertical incipient fracture in sandstone.			C2: Similar to C1, joint inclination is horizontal with up to 10° dip, joint spacing ranges from 0.5" - 26", clastic siltstone irregularly interbedded with sandstone present from 88.5" - 89".
230	30		C3	112/120	92	2.5, 2.5, 2.5, 2, 2.5, 2.5, 2.5, 2.5, 2.5, 2	Shaley partings in siltstone. Clasts and lenses of siltstone in sandstone. Fresh rock.			C3: ARGILLACEOUS SANDSTONE WITH INTERBEDDED SANDSTONE AND SILTSTONE, medium, slightly weathered, planar joints dipping up to 10° with slightly weathered faces, joint spacing ranges from 0.5" - 37:, siltstone beds are ~0.5" and appear periodically throughout sample, color is light - dark gray.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 117 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B206

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C4	59/60	86	2.5 2.5 2.5 2.5 2.5	Distinct bedding.			C4: Similar to C3, joint inclination is planar - 10°.
220	40		C5	61/60	97	2.5 2.5 2.5 2.5 2.5				C5: Similar to C3, joint inclination is planar - 20°, joint spacing ranges from 0.5" to 33".
210	50		C6	119/120	89	2.5 3 3 3 3 2.5 3 3 2.5 2.5				C6: (0-44") Similar to C3, joint inclination is planar - 20°, joint spacing ranges from 2.5" - 28". (45"-119") ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE, medium, slight weathering, joint inclination is planar - 40° with slight weathering on faces of joints, joint spacing ranges from 0.5" - 37", cross bedding present near bottom of sample.
			C7	118/120	96	2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	Increasing amounts of siltstone. Bedding-parallel fractures in siltstone.			Approximate top of Oswego Transition Zone at depth 57 ft (El. 203.5 ft). C7: ARGILLACEOUS SANDSTONE WITH SANDSTONE AND INTERBEDDED SILTSTONE, medium-hard, slightly weathered, joint inclination is planar - 10°, joint spacing ranges from 0.5" - 34.5" with slight weathering on joint faces, color is light - dark gray, siltstone beds from 1" - 4" present throughout sample.
200	60									
190	70		C8	121/120	95	3 3 3 3 3 3 3 3 3 3			C8: Similar to C7, joint inclination is planar - 10°, slight weathering on faces of joints. Oblong, siltstone clasts appear more frequently throughout sample.
180	80		C9	122/120	82	3 2.5 2.5 2.5 3				C9: Similar to C7, joint inclination is planar - 40° (at 59"), with slightly weathered faces, joint spacing ranges from 2" - 16.5", fewer siltstone clasts present than previous sample.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 117 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B206

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2.5 3 2.5 2.5				Approximate top of Pulaski Formation - Unit A at depth 83.5 ft (El. 177.0 ft).
170	90		C10	120/120	94	2.5 2.5 3 2.5 3 2.5 2.5 2.5 3 3	Well-lithified marine fossil debris.			C10: (0-18") Similar to C9, joint inclination is planar - 10°, joint spacing ranges from 6.5" - 11". (18"-120") SANDSTONE WITH INTERBEDDED SILTSTONE AND ARGILLACEOUS SANDSTONE, hard-medium, slight weathering, joint inclination is planar - 10° with joint spacing ranging from 1" - 19", color is light - dark gray with clastic siltstone appearing in sandstone near changes in rock type. 6" bed of fossiliferous sandstone at ~18".
160	100		C11	120/120	91	2 2.5 2.5 2 2.5 2.5 2.5 3 2.5 3	Disturbed bedding (soft sediment deformation).			C11: (0-37") Similar to C10 (18"-120"), joints are horizontal - 10°. (37"-120") SILTSTONE WITH INTERBEDDED SANDSTONE, medium, slightly weathered, joint inclination is planar - 10° with slight weathering on faces of joints, joint spacing is 1"-23", clastic sandstone deposits are present throughout sample, color is dark - light gray.
150	110		C12	121/120	88	2 2.5 2 2.5 2 2.5 2 2.5 2.5 2.5	Shaley partings. 1-inch-thick distinct green mineral layer (marker bed). Disturbed bedding (soft sediment deformation).			C12: Similar to C11 (37"-120"), joint inclination is generally planar with joint spacing ranging from 0.25" - 16.5", bedding is irregular, massive with little gradation occuring between rock types. Approximate top of Pulaski Formation - Unit B at depth 109 ft (El. 151.5 ft).
140	120		C13	118/120	91	2 2.5 2.5 2.5 2.5 2.5 2 2.5 2 2	Natural gas pocket at 117 ft. Measured gas level of 46% LEL.			C13: Similar to C12, joint inclination is planar - 10° with slight weathering on surfaces of joints, joint spacing is 0.5" - 15.5". C14: Similar to C12, joint inclination is planar - 10°, joint spacing ranges from 0.5" - 13.5".
			C14	116/120	91	2.5				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 117 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B206

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2.5 2.5 2.5 2.5 2.5 2.5 2.5 2 2.5				
130	130									
			C15	120/120	70	2.5 2 2.5 2.5 2.5 2 2.5 2.5 2.5 2.5	Moderately-dipping fractures in siltstone - dip-slip slickensides. Increasing amounts of sandstone.			C15: Similar to C12, joint inclination is planar - 10°, joint spacing ranges from 0.5" - 15", there is a moderately fractured zone in the top 24".
120	140									
			C16	62/60	100	2 2.5 2 2.5 2				Approximate top of Pulaski Formation - Unit C at 147 ft (El. 113.5 ft).
										C16: Similar to C12, joint inclination is planar - 10°, joint spacing ranges from 2" - 23", as a whole the sample is dominated by siltstone, there is a decreasing amount of sandstone.
110	150						Decreasing amount of sandstone.			Bottom of boring at depth 150 ft (El. 110.5 ft). Borehole grouted to approx. ground surface upon completion.
100	160						General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account. Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone. Vertical fractures occasionally present in sandstone beds.			
90	170						Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 117 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 261
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/18/2007
Total Depth (ft) : 150.0

Boring No.
B206

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
80	180									
70	190									
60	200									
50	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 117 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B206

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Stewart Date: 4/8/08

Rock Descriptions Checked by: Steph L. Ott Date: 4/7/08

Drilling and Sample Information Checked by: Scott M. Kay Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B207**

Boring Information

Northing : 1280806.6 **Easting :** 543863.7
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 262.1
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 9/19/2007 - 9/21/2007
Driller Name: Jay Stockholm
Logged By : S. Sarandis, K. Skinner
Drilling Company : Nothnagle
Total Depth (ft) : 151.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 3.5 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: 4.25-inch ID HSA to top of rock, pulled augers, placed 6-inch casing, cored with NQ barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	8/24	5-5-10-19	NA				S1: (0-7") SANDY SILT (ML); ~55% low plasticity fines, ~45% fine to medium sand, root fibers, organic material, dark brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 0.5 ft (El. 261.6 ft).
260										
			S2	16/24	17-24-36-46	NA				S1: (7-8") CLAYEY SAND (SC); ~~60% fine sand, ~5% medium to coarse sand, ~35% low plasticity fines, pieces of coarse gravel wedged in tip of sampler. Gray-brown mottled. GLACIAL TILL. S2: CLAYEY SAND WITH GRAVEL (SC): ~60% fine sand, ~5% medium to coarse sand, ~15% fine gravel, ~20% clayey fines. Light brown-gray. GLACIAL TILL. S3: CLAYEY SAND WITH GRAVEL (SC); Similar to S2 with 2" zone of weathered sandstone. GLACIAL TILL.
	10		S3	8/8	47-100/2"	NA				Approximate top of Oswego Sandstone at depth 10.6 ft (El. 251.5 ft).
250			C1	55/60	73	2				C1: SANDSTONE, gray, hard, bedded, fine, slightly weathered, smooth, horizontal fractures, fractures spaced at 2" to 24".
						2				
						2	Shaley partings.			
						3				
						3	Iron oxide on fracture faces - moderate weathering.			
			C2	119/120	96	2				C2: SANDSTONE, similar to C1 with occasional thin layers of siltstone up to 0.5" thick, local zones of convoluted bedding.
						3				
						3				
						2				
	20					2				
						2				
						2				
240						2	Siltstone clasts in sandstone.			
						1.5				
						1.5				
							Increasing amounts of siltstone, distinct bedding.			
			C3	118/120	82	2	Shaley partings - smooth fracture surfaces.			C3: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, smooth, planar, horizontal fractures spaced 2" to 24", layers and zones up to 3" thick of siltstone and shale, siltstone and shale layers are soft and highly fractured.
						2				
						3				
						3				
	30					3	Shaley partings.			
						3				
230						3				
						2				
						3				
						4				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 262
Vertical Datum : NGVD 29
Date Start / End: 9/19/2007 - 9/21/2007
Total Depth (ft) : 151.0

Boring No.
B207

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C4	120/120	95	2, 2, 3, 2, 2, 4, 2, 2, 2, 3	Increasing amounts of sandstone.			C4: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, smooth, planar horizontal fractures spaced at 2" to 48", occasional layers of siltstone up to 2" thick.
220	40									
			C5	120/120	93	2, 2, 3, 2, 2, 3, 3, 2, 3, 2	Distinct 6-inch-thick siltstone bed.			C5: SANDSTONE, similar to C4, with zones of convoluted bedding with interbedded siltstone layers.
210	50									
			C6	119/120	95	2, 2, 3, 1.5, 1.5, 2, 3, 3, 3, 4	Irregular fractures along siltstone and sandstone contacts.			C6: SANDSTONE, similar to C4, lower 10" alternating thin light and dark bands.
200	60									
							Shaley partings.			Approximate top of Oswego Transition Zone at depth 67.5 ft (El. 194.6 ft).
			C7	121/120	98	3, 2, 2, 2, 2, 3, 2, 3, 2, 3	Thin siltstone interbeds.			C7: (0-62") SANDSTONE, similar to C4. (62"-121") SANDSTONE, gray, hard, bedded, fine-grained, slightly weathered, smooth, planar, horizontal fractures spaced at 2" to 14", interbedded layers of siltstone and shale.
190	70									
			C8	118/120	88	2.5 Avg.				C8: SANDSTONE with interbedded siltstone and shale, similar to lower 60" of C7.
	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 262
Vertical Datum : NGVD 29
Date Start / End: 9/19/2007 - 9/21/2007
Total Depth (ft) : 151.0

Boring No.
B207

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
180							Disturbed bedding (soft sediment deformation).			
							Shale.			C9: (0-24") SANDSTONE, similar to lower 60" of C7. (24"-114") SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, gray, hard (siltstone and shale, medium hardness), cross bedded, fine grained, smooth planar joints spaced at 0.5" to 24", fossil debris present. Approximate top of Pulaski Formation - Unit A at depth 88.5 ft (El. 173.6 ft).
			C9	114/120	91	3				
						3				
						5				
						4				
	90					4	Well-lithified fossil debris.			
						3				
170						2				
						2				
						3	Disturbed bedding (soft sediment deformation). Shaley partings.			
						4				
			C10	67/60	100	3				C10: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, similar to C9 lower 90".
						3				
						3				
						2				
	100					3				
			C11	59/60	98	2				C11: SANDSTONE INTERBEDDED WITH SILTSTONE AND SHALE, similar to lower 90" of C9.
160						2				
						2				
						2				
						2				
			C12	117/120	93	2				C12: SANDSTONE, gray, hard, bedded with zones of cross bedding, fine grained, slightly weathered, smooth, planar horizontal fractures spaced at 1" to 24", layers of siltstone and shale, zones with fossil debris, 0.75" green layer at 5 ft from top of core run (~111 ft). A portion of of the green layer (110.9 ft - 110.95 ft) was analyzed petrographically. Approximate top of Pulaski Formation - Unit B at depth 111 ft (El. 151.1 ft).
						3				
						3				
						4				
	110					3	Laminated - smooth, talc-like.			
						3	2-inch-thick distinct green mineral layer (marker bed).			
150						3				
						3				
						3				
							Disturbed bedding (soft sediment deformation).			
			C13	115/120	88	2				C13: SANDSTONE, gray, hard, bedded and cross bedded, fine grained, slightly weathered, smooth planar fractures spaced at 2" to 24", interbedded siltstone, shale and graywacke.
						3				
						3				
						2				
	120					3				
						2				
140						3				
						3				
						4				
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 262
Vertical Datum : NGVD 29
Date Start / End: 9/19/2007 - 9/21/2007
Total Depth (ft) : 151.0

Boring No.
B207

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C14	120/120	93	3				C14: SANDSTONE with layers of siltstone and graywacke, hard, bedded, fine grained, slightly weathered, smooth, planar horizontal fractures spaced at 3" to 24".
						3				
						3				
						3				
	130					3				
						3				
130						3				
						5				
						4				
						3	Heavily fossiliferous sandstone.			
			C15	120/120	80	4	Disturbed bedding (soft sediment deformation). Mottled appearance. Shaley partings.			C15: SANDSTONE, gray, hard, bedded, fine grained, slightly weathered, fractures spaced at 1" to 18", several layers of shale up to 6" thick, shale tends to be highly fractured.
						3				
						3				
						3				
	140					3				
						4				
120						3				
						3				
						3	Shaley partings.			
						3				Approximate top of Pulaski Formation - Unit C at depth 145 ft (El. 117.1 ft).
			C16	61/60	100	3				C16: SANDSTONE, similar to C15.
						4				
						3	Smooth bedding-parallel fractures.			
						4				
	150					5				
110										Bottom of boring at depth 151 ft (El. 111.1 ft). Borehole grouted to approx. ground surface upon completion.
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
	160									
100							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 262
Vertical Datum : NGVD 29
Date Start / End: 9/19/2007 - 9/21/2007
Total Depth (ft) : 151.0

Boring No.
B207

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
90							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B207

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph 1. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Kate M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B208(MW)**

Boring Information

Northing : 1280921.3 **Easting :** 543897.4
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 265.3
Vertical Datum : NGVD 29
Rig Type/I.D: BK 81 / BL4

Date Start - End: 9/10/2007 - 9/17/2007
Driller Name: Gary Jones
Logged By : Francisco Trejo
Drilling Company : Boart Longyear
Total Depth (ft) : 151.0

Drilling Information

Hammer Ident: SN II
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ
Core Barrel I.D/O.D: 2.75 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 4.25-inch HSA to top of rock, pulled augers and placed 6-inch casing, cored with NQ barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	12/24	3-8-12-14	NA				S1: (0-6") SILTY SAND WITH GRAVEL (SM); ~70% mostly fine to medium sand, ~15% non-plastic fines, ~15% fine to coarse gravel (subrounded), roots, grass, wood, brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 1 ft (El. 264.3 ft).
			S2	17/24	7-25-41-43	NA				S1: (6-12") Similar to (0-6") except no roots, wood and grass, light brown. GLACIAL TILL. S2: CLAYEY SAND (SC); ~45% fine to medium sand, ~45% low plasticity fines, ~10% fine to coarse gravel. Bottom 10" light brown, top 7" brown, contains grass, roots, moist. GLACIAL TILL.
260			S3	20/23	7-17-30-50/5"	NA				S3: Similar to S2, no grass, roots. GLACIAL TILL.
			S4	22/24	30-19-30-44	NA				S4: CLAYEY SAND WITH GRAVEL (SC); 38% mostly fine to coarse sand, 46% clayey fines, 16% fine gravel, light brown. (Laboratory grain-size analysis performed.) GLACIAL TILL.
			S5	24/24	27-24-34-40	NA				S5: CLAYEY SAND WITH GRAVEL (SC); Similar to S4. LL = 18, PI = 7, light gray. (Laboratory Atterberg limit test performed.) GLACIAL TILL.
	10		S6	20/24	18-44-41-40	NA				S6: CLAYEY GRAVEL WITH SAND (GC); 52% fine to coarse gravel, 25% fines (LL = 17, PI = 6), 23% fine to coarse sand, 3" layer of fractured red rock, dark gray. (Laboratory grain-size and Atterberg limit tests performed.) GLACIAL TILL.
			S7	24/24	5-36-31-48	NA				S7: CLAYEY SAND WITH GRAVEL (SC); Similar to S4, dark gray. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 15 ft (El. 250.3 ft).
			S8	7/8	30-50/2"	NA				
250			C1	45/48	80	2				C1: SANDSTONE, with a layer of siltstone (1.5"), fractures planar and horizontal, light gray, sandstone medium to hard, fresh.
						2				
						2				
						3	Rough fracture surfaces, slightly weathered			
	20		C2	121/120	90	1.5	6-inch-long near-vertical incipient fracture.			C2: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray, fractures horizontal and planar, sandstone medium to hard, fresh, fine to medium grained.
						1.5				
						2	1-inch-long incipient fracture.			
						1.5	Shaley partings.			
						1.5	Irregular fractures around siltstone clasts.			
						1.5				
240						1				
						1.5				
						1				
						1.5	Shaley partings.			
	30		C3	119/120	91	2.5	1-inch-long vertical fracture, terminates in siltstone laminations.			C3: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray, fractures horizontal and planar, sandstone medium to hard, fresh, fine to medium grained.
						1.5				
						1.5				
						1.5				
						1.5				
						1				
						1.5				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at119 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 9/10/2007 - 9/17/2007
Total Depth (ft) : 151.0

Boring No.
B208(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
230						1.5				
						1				
						1.5				
	40		C4	117/120	91	1				C4: Similar to S3.
						1				
						1.5				
						3.5				
						4				
						1				
						1				
220						1				Approximate top of Oswego Transition Zone at depth 46.5 ft (El. 218.8 ft).
						1	More siltstone clasts.			
						1	Inclined fracture along moderately-dipping siltstone bed.			
	50		C5	120/120	95	1.5				C5: Similar to C4.
						1				
						1.5				
						2	Cross bedding.			
						1.5				
						2.5				
						2	Bedding-parallel fractures along siltstone beds.			
210						2.5				
						2				
						2.5				
	60		C6	118/120	97	1.5				C6: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE, fractures planar and horizontal, light gray to dark gray, fresh, sandstone medium to hard, siltstone soft.
						1				
						1				
						1				
						1				
						1	Shaley partings.			
200						1				
						1	Siltstone clasts and lenses.			
						1.5				
							Shaley partings.			
	70		C7	122/120	86	1				C7: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE, fractures planar and horizontal, highly fractures, light gray to dark gray, fresh, highly weathered zone (111"-113"), sandstone medium to hard, siltstone soft.
						1				
						1				
						1	6-inch-thick distinctive siltstone bed.			
						1				
						1				
190						1				
						1				
						1				
						1.5				C8: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE, interbedded shale, dark gray to light gray, fresh, sandstone medium to hard, siltstone soft, fractures planar and horizontal.
							Near-vertical fracture in argillaceous sandstone.			
	80		C8	121/120	95	2				
						1				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at119 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 9/10/2007 - 9/17/2007
Total Depth (ft) : 151.0

Boring No.
B208(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1 1 1 1 1.5 1 2 1.5				Approximate top of Pulaski Formation - Unit A at depth 89 ft (El. 176.3 ft).
180	90	C9	119/120	94		1 1 1 1 1 1 1 1 1 1	Well-lithified marine fossil debris. Disrupted bedding (soft sediment deformation). Shaley partings.			C9: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE WITH INTERBEDDED SHALE, dark gray to light gray, fresh, siltstone soft, sandstone medium to hard, fractures planar and horizontal, fossil debris at 3"-6", 23"-29" and 109"-111".
170	100	C10	121/120	98		1.5 1 1 1 1 1 1 1 1 1	Cross bedding.			C10: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE WITH INTERBEDDED LAYERS OF SHALE, dark gray to light gray, fresh, siltstone soft, sandstone medium to hard, fractures planar and horizontal, traces of fossils at 59". Approximate top of Pulaski Formation - Unit B at depth 106 ft (El. 159.3 ft).
160	110	C11	121/120	92		1 1 1 1 1 1 1 1 1 1	Disrupted bedding (soft sediment deformation).			C11: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, siltstone soft, sandstone medium to hard.
150	120	C12	119/120	99		1.5 1 1.5 1 1.5 1 1 1	Natural gas pocket at 119 ft.			C12: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, sandstone medium to hard, siltstone soft.
140										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at119 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 9/10/2007 - 9/17/2007
Total Depth (ft) : 151.0

Boring No.
B208(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1 1				
	130		C13	76/72	86	1 1 1.5 1 1 1	Fossiliferous, disrupted bedding (soft sediment deformation). Fresh rock.			C13: Similar to C12, layer of fossils found at 8" - 12".
130			C14	45/48	83	1.5 1.5 1.5 1.5	45° inclined fracture in siltstone with slickensides.			C14: Similar to C12, one vertical fracture at 12" (30°).
	140		C15	120/120	77	3 2.5 2 2 2.5 2 1.5 1.5 1.5 1.5	Moderately dipping fracture in siltstone with slickensides. Shaley partings, bedding-parallel fractures.			C15: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, highly weathered zone at 36", fractures planar and horizontal, highly fractured, two vertical fractures at 6" and 85", siltstone soft, sandstone medium to hard, fresh. Approximate top of Pulaski Formation - Unit C at depth 144 ft (El. 121.3 ft).
120										
	150		C16	27/24	89	1.5 1.5	Disrupted bedding (soft sediment deformation).			C16: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, fractures planar and horizontal, siltstone soft, sandstone medium to hard, fresh.
110							General Comments about Core Samples: Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			Bottom of boring at depth 151 ft (El. 114.3 ft). Groundwater Monitoring well installed upon completion (screen interval: 138 ft to 148.3 ft). See separate Groundwater Well Installation Log for details.
	160						Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
100							Vertical fractures occasionally present in sandstone beds.			
	170						Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport. Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at119 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 265
Vertical Datum : NGVD 29
Date Start / End: 9/10/2007 - 9/17/2007
Total Depth (ft) : 151.0

Boring No.
B208(MW)

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
90										
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at119 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B208(MW)

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Stutzbach Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitts Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kennedy Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No.
B209(MW)
Page 1 of 1

Boring Information

Northing : 1280924.5 **Easting :** 543901.5
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 266
Vertical Datum : NGVD 29
Rig Type/I.D: BK 81 / BL4

Date Start - End: 9/17/2007 - 9/17/2007
Driller Name: Gary Jones
Logged By : Francisco Trejo
Drilling Company : Boart Longyear
Total Depth (ft) : 52.0

Drilling Information

Hammer Ident: NA
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Drilling Method: 4.25-inch HSA to top of rock. 4-inch air hammer from 15 ft to 52 ft.

Casing I.D: NM
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NA
Core Barrel I.D/O.D: NA / NA
Core Barrel Length: NA

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
260										Boring advanced to 52 ft without sampling.
	10									
250										
	20									
240										
	30									
230										
	40									
220										
	50									
210										Bottom of boring at depth 52 ft (El. 214.0 ft). Groundwater Monitoring well installed upon completion (screen interval: 25 ft to 45.3 ft). See separate Groundwater Well Installation Log for details.

Notes:

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B209(MW)

Project: Nine Mile Point Site Characterization — GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: [signature] Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: [signature] Date: 4/8/08

Rock Descriptions Checked by: [signature] Date: 4/7/08

Drilling and Sample Information Checked by: [signature] Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B211**

Boring Information

Northing : 1280976.9 **Easting :** 543972.8
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 268.3
Vertical Datum : NGVD 29
Rig Type/I.D: BK 81 / BL4

Date Start - End: 9/17/2007 - 9/20/2007
Driller Name: Gary Jones
Logged By : Francisco Trejo
Drilling Company : Boart Longyear
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN II
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Casing I.D: NM
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ
Core Barrel I.D/O.D: 2.75 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 4.25-inch HSA to top of rock, cored bedrock with NQ core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
		X	S1	18/24	5-13-13-12	NA				S1: SILTY SAND (SM); ~65% mostly fine sand, ~25% slightly-plastic fines, ~10% fine to coarse gravel (subangular). Light brown, contained roots and pieces of wood. GLACIAL TILL.
		X	S2	15/24	11-19-13-29	NA				S2: (0-10"): SILTY SAND (SM); ~70% fine to medium sand, ~25% slightly-plastic fines, ~5% fine to coarse gravel (subangular), brown. (10-15") WIDELY GRADED SAND WITH GRAVEL (SW); ~60% fine to medium sand, ~35% fine to coarse gravel (subangular), ~5% non-plastic fines. Brown. GLACIAL TILL.
260	10	X	S3	16/24	9-15-44-33	NA				S3: SILTY SAND (SM); ~60% mostly fine to medium sand, ~30% slightly-plastic fines, ~10% fine gravel, light gray. GLACIAL TILL.
		X	S4	24/24	19-22-32-35	NA				S4: (0-20"): SILTY SAND (SM); Similar to S3. GLACIAL TILL. (20-24"): SILTY SAND (SM); Similar to S1. GLACIAL TILL.
250	20	X	S5	13/24	3-6-14-40	NA				S5: SILTY SAND (SM); Similar to S3. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 22 ft (El. 246.3 ft).
			C1	35/36	43	1 1.5 NM	Iron oxide - moderate weathering.			C1: SANDSTONE, light gray, highly fractured, fractures planar and horizontal, fine grained, sandstone hard.
240	30		C2	110/120	83	1 1.5 1 1 1.5 1 1 1 1 1	Shaley partings in siltstone. Irregular fracture surfaces around clasts. Shaley partings in siltstone. Distinct bedding.			C2: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray, fractures planar and horizontal, sandstone hard, siltstone soft, one fracture at approx. 15° (at 77"), fine grained.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 150 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/20/2007
Total Depth (ft) : 150.0

Boring No. **B211**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C3	120/120	86	1.5				C3: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, sandstone hard, siltstone soft, fine grained.
						1				
						1				
230						1	Fractures along siltstone clasts and lenses.			
						1				
	40					1				
						1				
						1				
						1	Massive.			
						1	Shaley partings.			
			C4	117/120	91	1	Shaley partings.			C4: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, sandstone hard, siltstone soft, fine grained.
						1				
						1				
220						1				
						1.5				
	50					1				
						1	Shaley partings.			
						1				
						1				
						1				
			C5	120/120	88	1	Shaley partings.			C5: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, sandstone hard, siltstone soft.
						1				
						1.5				
210						1				
						1				
	60					1				
						1				
						1				
						1				
						1	Smooth planar fractures - bedding-parallel.			
			C6	118/120	94	1				C6: Similar to C5.
						1				
						1				
200						1				
						1				Approximate top of Oswego Transition Zone at depth 70 ft (El. 198.3 ft).
	70					1	Clasts and lenses of siltstone.			
						1				
						1				
						1				
						1				
			C7	120/120	97	1.5				C7: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE, light gray to dark gray, fractures planar and horizontal, sandstone hard, siltstone soft.
						1.5				
						1.5				
190						1				
						1				
	80					1				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 150 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/20/2007
Total Depth (ft) : 150.0

Boring No. **B211**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1 1 1 1.5	Shaley partings.			C8: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, trace of fossils (73" and 86"), 6" bed of black shale, sandstone hard, siltstone soft.
			C8	120/120	98	1.5 2 1 1 1 1 1 1 1 1	Fracture along dipping bedding of clast. Well-lithified marine fossil debris.			Approximate top of Pulaski Formation - Unit A at depth 88.5 ft (El. 179.8 ft).
180	90									
			C9	110/120	92	1.5 1.5 1.5 1 1 1 1 1 1	Shaley partings. Disturbed bedding (soft sediment deformation). Shaley partings. Vertical fractures in argillaceous sandstone.			C9: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, trace of marine fossils at (64" and 80"), sandstone hard, siltstone soft.
170	100									
			C10	119/120	92	1.5 1 1 1.5 1.5 1 1.5 1 1 1	Disturbed bedding (soft sediment deformation). Disturbed bedding (soft sediment deformation).			C10: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, sandstone hard, siltstone soft. Approximate top of Pulaski Formation - Unit B at depth 115 ft (El. 153.3 ft).
160	110									
			C11	114/120	95	1 1 1 1 1 1.5 1 1 1 1				C11: Similar to C10.
150	120									
			C12	123/120	97	1				C12: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, highly fractured zone at 68", trace of fossils at 83", sandstone hard, siltstone soft.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 150 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/20/2007
Total Depth (ft) : 150.0

Boring No.
B211

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1				
						1				
140						1	6-inch-long vertical fracture in argillaceous sandstone.			
						1				
	130					1	Fossiliferous.			
						1				
						1				
						1				
						1				
			C13	116/120	87	1.5	Vertical fracture in siltstone.			C13: ALTERNATING LAYERS OF SILTSTONE AND SANDSTONE INTERBEDDED WITH SHALE, dark gray to light gray, fractures planar and horizontal, sandstone hard, siltstone soft.
						1.5				
						1.5				
130						1				
						1				
	140					1				
						1				
						1				
						1				
						1				
										Approximate top of Pulaski Formation - Unit C at depth 146 ft (El. 122.3 ft).
			C14	60/60	93	1.5				
						1.5				
						1	Moderately-dipping fracture in siltstone.			C14: Similar to C13.
120						1				
						1				
	150						Natural gas pocket at 150 ft.			Bottom of boring at depth 150 ft (El. 118.3 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
110										
	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
100							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170						Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 150 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 9/17/2007 - 9/20/2007
Total Depth (ft) : 150.0

Boring No.
B211

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
90										
	180									
80										
	190									
70										
	200									
60										
	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 150 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B211

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shotts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schaub Date: 4/8/08

Rock Descriptions Checked by: Stephen J. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B212**

Boring Information

Northing : 1280938.8 **Easting :** 544013.9
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 269.4
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/11/2007 - 10/15/2007
Driller Name: Jay Stockholm
Logged By : Francisco Trejo
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 6 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: 4.25-inch HSA to 17.5 ft. Pulled augers and placed 6-inch temp. casing, cored bedrock with NQ2 barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	17/24	1-4-12-14	NA				S1: (0-6"): SILTY SAND (SM); ~80% mostly fine sand, ~15% non-plastic fines, ~5% coarse gravel (subangular). Black, contained roots, grass and leaves. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 1 ft (El. 268.4 ft).
			S2	5/6	100	NA				S1: (6-17"): SILTY SAND (SM); ~65% fine to medium sand, ~25% slightly-plastic fines, ~10% fine to coarse gravel. Light brown, dry. GLACIAL TILL. S2: SILTY SAND (SM); ~75% fine to coarse sand, ~15% slightly-plastic fines, ~10% mostly fine gravel (subangular). Brown. GLACIAL TILL.
260	10		S3	20/24	21-27-31-33	NA				S3: SILTY SAND WITH GRAVEL (SM); ~70% fine to coarse sand, ~15% slightly-plastic fines, ~15% mostly fine gravel. Gray. GLACIAL TILL.
			S4	17/24	12-17-17-20	NA				S4: (0-6"): SILTY SAND WITH GRAVEL (SM); ~55% fine to coarse sand, ~25% fine to coarse gravel, ~20% slightly-plastic fines. Gray, moist. (6-17"): SILTY SAND (SM); ~80% mostly fine sand, ~15% slightly-plastic fines, ~5% fine gravel. Gray, moist. GLACIAL TILL. Approximate top of Oswego Sandstone at depth 17.5 ft (El. 251.9 ft).
250	20		C1	34/36	81	3 3 3	Slightly weathered.			C1: SANDSTONE, light gray, fine grained, hard, fractures planar and horizontal, fracture at 6" approx. 10° from horizontal.
			C2	59/60	73	3 3 3 3 3	Shaley partings.			C2: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, fractures planar and horizontal, light gray.
240	30		C3	119/120	82	3 3 3 3 3 3 3 3 3 3	Fresh rock. Irregular horizontal fracture surfaces around small siltstone clasts.			C3: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, fractures at 106" and 113" approx. 10° from horizontal.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 269
Vertical Datum : NGVD 29
Date Start / End: 10/11/2007 - 10/15/2007
Total Depth (ft) : 150.0

Boring No. **B212**

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C4	120/120	83	3 3 3 3 3 3 3 3 3 3	Shaley partings. 6-inch-long vertical fracture in sandstone - calcite infill on fracture surface. Moderately-dipping fracture with dip-slip slickensides. Siltstone lenses and clasts in sandstone.			C4: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, fractures at 11" and 43" approx. 10° from horizontal.
230	40									
			C5	119/120	97	3 3 3 3 3 3 3 3 3 3	Moderately-dipping bedding plane fracture in argillaceous sandstone.			C5: ARGILLACEOUS SANDSTONE, gray, fine grained, bedded, well sorted, fresh, fractures typically 1-31.5" planar, except approx. 15° at 27". Layer of siltstone at 27" - 30".
220	50									Approximate top of Oswego Transition Zone at depth 55 ft (El. 214.4 ft).
			C6	120/120	91	3 3 3 3 3 3 3 3 3 3				C6: SANDSTONE INTERBEDDED WITH SILTSTONE, light gray, fine grained, medium to hard, fractures planar and horizontal, fracture at 27" approx. 10° from horizontal.
210	60									
			C7	120/120	97	3 3 3 3 3 3 3 3 3 3	Bedding becomes distinct with cross bedding. Shaley partings. Lenses of siltstone in sandstone.			C7: SANDSTONE INTERBEDDED WITH SILTSTONE, light gray, medium grained, fractures planar and horizontal, fractures at 111" approx. 15° from horizontal, 6" bed of black shale.
200	70									
			C8	120/120	99	3 3 3 3 3				C8: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, light gray to dark gray, fractures planar and horizontal, fossils at 83", sandstone hard, siltstone soft.
190	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 269
Vertical Datum : NGVD 29
Date Start / End: 10/11/2007 - 10/15/2007
Total Depth (ft) : 150.0

Boring No.
B212

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3 3 3 3 3	Shaley partings.			C9: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray, fractures planar and horizontal, fossils at 77", 85" and 101" approx. 2" thick, siltstone soft. Approximate top of Pulaski Formation - Unit A at depth 87.5 ft (El. 181.9 ft).
			C9	119/120	98	3 3 3 3 3 3 3 3 3 3	Disturbed bedding (soft sediment deformation). Distinct 6-inch-thick siltstone layer (marker bed). Smooth, planar fractures. Well-lithified marine fossil debris in argillaceous sandstone.			
180	90									
			C10	118/120	91	3 3 3 3 3 3 3 3 3 3	Disrupted bedding (soft sediment deformation). Shaley partings. Calcite filled vugs in argillaceous sandstone. Fossiliferous.			C10: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, fractures horizontal and planar, dark gray, fossils at 84" approx. 2" thick layer, a large piece of whitish and pinkish stone at 75", siltstone soft, sandstone hard.
170	100									
			C11	118/120	98	3 3 3 3 3 3 3 3 3 3	Siltstone laminations. Distinct bedding.			C11: SILTSTONE INTERBEDDED WITH LAYERS OF SANDSTONE AND SHALE, dark gray, fractures horizontal and planar, sandstone hard, siltstone soft.
160	110									
			C12	119/120	92	3 3 3 3 3 3 3 3 3 3	Disrupted bedding (soft sediment deformation).			C12: SILTSTONE INTERBEDDED WITH LAYERS OF SANDSTONE AND SHALE, dark gray, fractures planar and horizontal, sandstone hard, siltstone soft.
150	120									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 269
Vertical Datum : NGVD 29
Date Start / End: 10/11/2007 - 10/15/2007
Total Depth (ft) : 150.0

Boring No.
B212

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C13	120/120	95	3	Shaley partings.			C13: SILTSTONE INTERBEDDED WITH LAYERS OF SANDSTONE AND SHALE, dark gray, fractures planar and horizontal, fractures at 95" approx. 10° from horizontal, siltstone soft, sandstone hard.
						3				
						3				
						3				
140						3				
	130					3	Fossiliferous.			
						3				
						3				
						3				
						3				
							Fractures around siltstone clasts.			
			C14	117/120	80	3				C14: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, 3 ft bed of sandstone, fractures planar and horizontal, one fracture at 48" approx. 15° from horizontal, siltstone soft, sandstone hard.
						3				
						3				
						3				
130						3	Convoluted bedding (soft sediment deformation).			Approximate top of Pulaski Formation - Unit B at depth 140.5 ft (El. 128.9 ft).
	140					3				
						3				
						3				
						3	6-inch-long incipient fracture in sandstone with calcite infill.			
						3				
			C15	54/54	85	3				C15: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, alternating light gray and dark gray, fractures planar and horizontal, fractures at 28" and 49" approx. 15° from horizontal, siltstone soft, sandstone hard.
						3				
						3				
						3				
120							Shaley partings.			
	150									Bottom of boring at depth 150 ft (El. 119.4 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
110	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
100	170									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 269
Vertical Datum : NGVD 29
Date Start / End: 10/11/2007 - 10/15/2007
Total Depth (ft) : 150.0

Boring No.
B212

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
90	180									
80	190									
70	200									
60	210									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

NINE MILE POINT SITE CHARACTERIZATION 1 NMP GINT LOGS.GPJ GEI DATA TEMPLATE.GDT 4/1/08

Final Boring Log Signature Page	Boring No. B212

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shields Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Edwards Date: 4/8/08

Rock Descriptions Checked by: Steph. L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B213**

Boring Information

Northing : 1281129.8 **Easting :** 544047.2
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 265.6
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/8/2007 - 10/11/2007
Driller Name: Jay Stockholm
Logged By : C. Conti, F. Trejo
Drilling Company : Nothnagle
Total Depth (ft) : 150.5

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4 inch
Auger Head Length: 6 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft
Drilling Method: 4.25-inch HSA to 14 ft. Cored bedrock with NQ2 wireline core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			S1	14/24	4-8-11-13	NA				S1: (0-3"): SILTY SAND WITH GRAVEL (SM); ~60% sand, ~25% fines (non-plastic), ~15% gravel to 0.5". Brown, roots and other plant material. Organic topsoil. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 1 ft (El. 264.6 ft).
260			S2	18/24	7-28-24-30	NA				S1: (3-14"): SILTY GRAVEL WITH SAND (GM); 36% fine to coarse gravel (max size 1"), 33% fine to coarse sand, 31% slightly plastic fines, light brown. (Laboratory grain-size analysis performed.) GLACIAL TILL. S2: SANDY SILT (ML); ~50% slightly plastic fines, ~40% fine to coarse sand, ~10% fine gravel, gray with light brown to medium brown layers. GLACIAL TILL.
	10		S3	20/24	10-22-32-33	NA				S3: SANDY SILT (ML); 53% slightly plastic fines, 39% fine to coarse sand, 8% fine gravel, gray. (Laboratory grain-size analysis performed.) GLACIAL TILL. Approximate top of Oswego Sandstone at depth 14 ft (El. 251.6 ft).
			C1	16/18	56	3 NM	6-inch-long vertical fracture in sandstone, slightly weathered.			C1: SANDSTONE, light gray, fractures planar and horizontal, highly fractured, sandstone hard.
250			C2	57/60	65	3 3 3 3 3	Fractures along inclined siltstone lenses.			C2: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray, fractures horizontal and planar, fracture at 49" approx. 20° from horizontal, fine grained.
	20		C3	61/60	89	3 3 3 3 3				C3: SANDSTONE INTERBEDDED WITH SILTSTONE, sandstone fine grained, fractures horizontal and planar, light gray, sandstone hard, siltstone soft.
240			C4	120/120	90	3 3 2.5 3 3 2.5 3 3 3 3	Shaley partings. 3-inch-long vertical incipient fracture in sandstone. Shaley partings.			C4: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, sandstone fine grained, light gray to dark gray, fractures planar and horizontal, fracture at 98" approx. 10° from horizontal.
	30									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 266
Vertical Datum : NGVD 29
Date Start / End: 10/8/2007 - 10/11/2007
Total Depth (ft) : 150.5

Boring No.
B213

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
230			C5	118/120	85	3		C5: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, sandstone fine grained, sandstone hard, siltstone soft, fractures planar and horizontal, fracture at 105" approx. 10° from horizontal.
						3	Shaley partings.	
						3		
						3	Inclined fracture in siltstone.	
						3		
	40					3		
						3		
						2.5		
						3		
						3	Shaley partings.	
220			C6	119/120	97	3		C6: SANDSTONE INTERBEDDED WITH SILTSTONE, sandstone hard, siltstone soft, fractures planar and horizontal, sandstone fine grained, light gray.
						3		
						3		
						3		
						3		
	50					3		
						3		
						3		
						3		
						3		
210			C7	118/120	93	3		C7: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, sandstone hard, siltstone soft, fractures planar and horizontal, light gray to dark gray, fractures at 1" and 46" approx. 20° from horizontal.
						3		
						3	Cross-bedding.	
						3	Dipping fracture in siltstone.	
	60					3	Dip-slip slickensides.	
						3	Siltstone clasts and lenses in sandstone.	Approximate top of Oswego Transition Zone at depth 62.5 ft (El. 203.1 ft).
						3	6-inch-long incipient fracture in sandstone with calcite infill.	
						3		
						3		
200			C8	120/120	88	3		C8: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE, light gray to dark gray, fractures planar and horizontal, highly fractured zone at 34", sandstone hard, siltstone soft.
						3		
						3	Shaley partings.	
						3		
	70					3		
						3		
						3		
						3		
						3	4-inch-long vertical fracture in sandstone. Calcite on fracture surfaces.	
						3		
190			C9	120/120	87	3		C9: SANDSTONE INTERBEDDED WITH LAYERS OF SILTSTONE AND SHALE, light gray to dark gray, fractures planar and horizontal, sandstone hard, siltstone soft.
						3		
						3		
						3	Siltstone fracture along dipping bedding plane.	
						3		
	80							

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 266
Vertical Datum : NGVD 29
Date Start / End: 10/8/2007 - 10/11/2007
Total Depth (ft) : 150.5

Boring No. **B213**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						3				
						3	Disturbed bedding (soft sediment deformation).			
						3				
						3				
						3				Approximate top of Pulaski Formation - Unit A at depth 85 ft (El. 180.6 ft).
							4-inch-long vertical fracture in siltstone.			
180							Shaley partings.			
			C10	120/120	97	4				C10: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE INTERBEDDED WITH SHALE, light gray to dark gray, sandstone hard, siltstone soft, fractures planar and horizontal, trace of fossils at 7", 16", 32" and 100" approx. 2" thick layer.
						4				
						4				
						4				
						4	Smooth, planar, horizontal fractures.			
	90					4				
						4	Well-lithified marine fossil debris.			
						4				
						4				
						4	Shaley partings.			
170										
			C11	113/120	88	4				C11: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray, fracture planar and horizontal, fractured interval at 120" approx. 0.5" thick.
						4				
						4				
						4				
						4				
	100					4				
						4				
						4				
						4				
						4				
160										
			C12	120/120	88	4				C12: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray, fractures planar and horizontal.
						4				
						4				
						4				
						4				
	110					4	Smooth, planar horizontal fractures.			
						4	Convoluted bedding (soft sediment deformation).			
						4				
						4				
						4				C13: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray, fractures planar and horizontal, sandstone hard, siltstone soft.
150										
			C13	120/120	88	4	Natural gas pocket at 116 ft.			Approximate top of Pulaski Formation - Unit B at depth 117.5 ft (El. 148.1 ft).
						4				
						4				
						4				
						4	Mottled appearance due to disrupted bedding (soft sediment deformation).			
	120					4				
						4				
						4				
						4				
						4				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 266
Vertical Datum : NGVD 29
Date Start / End: 10/8/2007 - 10/11/2007
Total Depth (ft) : 150.5

Boring No.
B213

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C14	116/120	98	4				C14: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE INTERBEDDED WITH SHALE, light gray to dark gray, sandstone hard, siltstone soft, fractures planar and horizontal, fracture at 108" approx. 10° from horizontal, fossils at 22" and 65".
						4				
						4				
						4				
						4				
	130					4				
						4				
						4				
						4				
						4				
						4				C15: ALTERNATING LAYERS OF SANDSTONE AND SILTSTONE INTERBEDDED WITH SHALE, light gray to dark gray, fractures planar and horizontal, a 3 ft to 4 ft thick bed of sandstone from 134 ft to 138 ft.
130							Cross bedding.			
			C15	55/60	72	4				
						4				
						4				
						4	Shaley partings.			
						4	Disrupted bedding (soft sediment deformation).			Approximate top of Pulaski Formation - Unit C at depth 140.5 ft (El. 125.1 ft).
	140									
			C16	120/120	89	4				C16: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray, fractures planar and horizontal, fracture at 13" approx. 15° from horizontal, highly fractured zone at 113".
						4				
						4	Moderately-dipping fracture in siltstone. Dip-slip slickensides.			
						4				
						4				
120						4	10-inch-long vertical incipient fracture in sandstone. Calcite infill.			
						4				
						4	Shaley partings.			
						4				
						4				
							Shaley partings.			
	150									
										Bottom of boring at depth 150.5 ft (El. 115.1 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
110										
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone			
100							Vertical fractures occasionally present in sandstone beds.			
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 266
Vertical Datum : NGVD 29
Date Start / End: 10/8/2007 - 10/11/2007
Total Depth (ft) : 150.5

Boring No.
B213

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
90										
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B213

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Shutak Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Mark A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1

Final Boring Log

Boring No. **B214**

Boring Information

Northing : 1281058 **Easting :** 544085.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 267.8
Vertical Datum : NGVD 29
Rig Type/I.D: CME 75 / N2

Date Start - End: 10/3/2007 - 10/5/2007
Driller Name: Jay Stockholm
Logged By : Jay Scully
Drilling Company : Nothnagle
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN IV
Auger I.D: 4.25 inch
Auger Head Length: 3.5 inch

Casing I.D: 6 inch
Drill Rod O.D: 2.625 inch NW

Core Barrel Type: NQ
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13 ft

Drilling Method: HSA 0-14.5 ft, spun 6-inch casing to 14.5 ft, coring with NQ core barrel.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.

Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger

WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample

NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Soil-Sample Description Rock-Lithological Description
			S1	15/24	4-4-4-14	NA	0-3.5 ft is surficial soils.	S1: SILTY SAND (SM); ~75% fine to coarse sand, ~15% non-plastic fines, ~10% gravel. Brown. Soil contains roots and pieces of wood. SURFICIAL DEPOSITS.
								Approximate top of Glacial Till at depth 3.5 ft (El. 264.3 ft).
			S2	21/24	10-29-38-44	NA		S2: SANDY LEAN CLAY (CL); 51% low plasticity fines, 42% fine to medium sand, 7% fine gravel, brown. (Laboratory grain-size analysis performed.) GLACIAL TILL.
260								
	10		S3	20/24	53-21-20-24	NA		S3: SANDY LEAN CLAY (CL); 55% low plasticity fines, 36% fine to coarse sand, 9% fine gravel, gray. (Laboratory grain-size analysis performed.) GLACIAL TILL.
								Approximate top of Oswego Sandstone at depth 14.5 ft (El. 253.3 ft).
							Auger refusal at 14.5 ft.	
			C1	16/24	42	2 3		C1: SANDSTONE, gray, hard, bedded, fine grained, well sorted, fresh rock, fractures space 2" to 10".
250			C2	115/120	78	2 3 2 3 2 3 2 3 2 3	Slight weathering.	C2: ARGILLACEOUS SANDSTONE, gray, hard, bedded, fine, well sorted, fresh rock, fractures 0.5" to 14.5", approx. 10° from horizontal. Shale layer at 32-33".
	20							
240			C3	121/120	93	2 2 2 2 2 2 2 2 2	Shaley partings. Shaley partings.	C3: ARGILLACEOUS SANDSTONE, gray, medium to hard, fine, well-sorted, fresh rock, fractures 0.5" to 30", approx. 10° from horizontal, siltstone clasts at 92" to 100", shale bed at 110" to 115", vertical fracture at 33" to 36".
	30							

Fractures | Graphic Log

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 126.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 10/3/2007 - 10/5/2007
Total Depth (ft) : 150.0

Boring No.
B214

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2	Clasts and lenses of siltstone in sandstone.			
230	40		C4	121/120	96	2 2 2 2 2 2 2 2 2 2	Irregular fracture surfaces along siltstone clasts.			C4: SANDSTONE, gray, medium to hard, bedded, fine, well sorted, fresh rock, fractures 0.5" to 23.5" planar to dipping approx. 20°, argillaceous sandstone at 79" to 111".
220	50		C5	119/120	100	2 2 2 2 2 2 2 2 2 2	Distinct cross bedding.			C5: ARGILLACEOUS SANDSTONE, gray, hard, cross bedded, fine, well sorted, fresh rock, fractures 12" to 68" planar to dipping approx. 10°.
							Shaley partings.			Approximate top of Oswego Transition Zone at depth 57 ft (El. 210.8 ft).
210	60		C6	114/120	76	2 2 2 2 2 2 2 2 2 2				C6: SANDSTONE INTERBEDDED WITH SILTSTONE, gray, hard, bedded, fine, well sorted, slightly weathered, fractures 0.5" to 18" approx. 10°, bottom fractures at approx. 30°.
200	70		C7	68/60	100	2 2 2 2 2	Fracture along moderately-dipping siltstone lamination in sandstone. Siltstone clasts in argillaceous sandstone.			C7: ARGILLACEOUS SANDSTONE, gray, medium to hard, bedded, fine, well sorted, slightly weathered, fractures 2" to 33" approx. 10° from horizontal.
							Distinct cross bedding.			
			C8	61/60	88	2 2 2 2 2				C8: SANDSTONE INTERBEDDED WITH ARGILLACEOUS SANDSTONE AND SILTSTONE, gray, medium to hard, bedded, fine, well sorted, slightly weathered, fractures 1" to 28", planar fractures dipping at approx. 10° from horizontal.
190	80		C9	120/120	85	2 2 2 2 2	Shaley partings.			C9: ARGILLACEOUS SANDSTONE INTERBEDDED WITH SILTSTONE AND SANDSTONE, gray, medium, fine, well sorted, slightly weathered, fractures 0.5" to 20" typically planar, irregular fractures approx. 45° at 75".
										Approximate top of Pulaski Formation - Unit A at depth 80 ft (El. 187.8 ft).

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 126.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 10/3/2007 - 10/5/2007
Total Depth (ft) : 150.0

Boring No.
B214

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						2	Sandstone clasts in siltstone.			
						2				
						2				
						2				
						2				
180			C10	120/120	94	3	Dense marine fossil debris.			C10: SILTSTONE WITH ARGILLACEOUS SANDSTONE, gray, medium, fine, well sorted, slightly weathered, fractures 0.5" to 17" planar, highly fractured shale layer at 108" to 109", fossiliferous layer at 42" to 45".
						3				
						3				
	90					3				
						3				
						3				
						3				
						3				
						3				
						3				
						3	Shaley partings.			
170			C11	113/120	90	3	Disrupted bedding (soft sediment deformation). Shaley partings. Fossiliferous.			C11: SILTSTONE WITH ARGILLACEOUS SANDSTONE, gray, medium, fine, well sorted, slightly weathered, fractures 3" to 46" typically planar, fractured shale layer at 28", 30" - 31" and 37". Fossiliferous layer at 40" - 43".
						3				
						3				
	100					3				
						3				
						3				
						3				
						3				
						3				
						3				
						3				
160			C12	120/120	94	3				C12: SILTSTONE WITH SANDSTONE, gray, medium to hard, well sorted, slightly weathered, fractures 1" to 16.5" planar. Green mineral layer at 90" to 91".
						3				
						3				
	110					3				
						3				
						3				
						3				
						3	Shaley partings.			Approximate top of Pulaski Formation - Unit B at depth 114 ft (El. 153.8 ft).
						3				
						3	Green mineral layer (marker bed).			
							Disturbed bedding (soft sediment deformation).			
150			C13	120/120	96	3				C13: SILTSTONE WITH SANDSTONE, similar to C12, except fractures 1" to 17.5", shale layers at 80" - 81" and 90" - 91".
						3				
						3				
	120					3	Convoluted bedding (soft sediment deformation).			
						3				
						3				
						3				
						3				
						3				
						3	Shaley partings.			
						3				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 126.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 10/3/2007 - 10/5/2007
Total Depth (ft) : 150.0

Boring No.
B214

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
140			C14	119/120	98	3	Natural gas pocket at 126.5 ft.			C14: SILTSTONE WITH SANDSTONE, gray, medium to hard, bedding and some irregular bedding, fine, well sorted, slightly weathered, fractures 1" to 39", fossiliferous layers at 51" - 53" and 65" - 66", irregular fracture at 31", rough surface along irregular bedding.
						3				
						3	Fracture along wavy bedding.			
	130					3				
						3				
						3				
						3				
						3	Fossiliferous.			
						3				
						3				
						3				
										C15: SILTSTONE WITH SANDSTONE, gray, medium to hard, bedded and irregular bedding, fine, well sorted, slightly weathered, fractures 0.5" to 14.5" dipping at approx. 10° from horizontal, shale layers at 69" - 70", 79" - 80", 94" - 95" and 101" - 102".
130			C15	120/120	73	3				
						3				
						3				Approximate top of Pulaski Formation - Unit C at depth 140 ft (El. 127.8 ft).
						3				
	140					3				
						3	Smooth, bedding-parallel fractures.			
						3				
						3				
						3				
						3				
			C16	61/42	100	3	Rough fracture in siltstone.			C16: SILTSTONE, minor interbedded sandstone, gray, medium, laminated, fine, well sorted, slightly weathered, fractures 0.5" to 13", rough fracture interval at 9" - 10".
120						3				
						3				
	150									Bottom of boring at depth 150 ft (El. 117.8 ft). Borehole grouted to approx. ground surface upon completion.
							General Comments about Core Samples:			
							Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.			
110										
	160									
							Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.			
							Vertical fractures occasionally present in sandstone beds.			
100										
							Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.			
	170									
							Rock is hard, fresh, and unweathered unless otherwise			

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 126.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 268
Vertical Datum : NGVD 29
Date Start / End: 10/3/2007 - 10/5/2007
Total Depth (ft) : 150.0

Boring No.
B214

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
							noted. Fracture surfaces are generally unweathered unless otherwise noted.			
90										
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 126.5 ft.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B214

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Stutts Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Steph A. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Beth M. Kenney Date: 4/8/08

Notes: A. Cummings verified locations of fractures

Form 150.3 rev. 1

Final Boring Log

Boring No. **B215**

Boring Information

Northing : 1281214.5 **Easting :** 544162.3
Horizontal Datum : NAD 27
Ground Surface Elev. (ft): 262.5
Vertical Datum : NGVD 29
Rig Type/I.D: Ditrech B-50 /

Date Start - End: 9/20/2007 - 9/25/2007
Driller Name: Wes Imhoff
Logged By : B. Bhattachaya, F. Trejo
Drilling Company : Boart Longyear
Total Depth (ft) : 150.0

Drilling Information

Hammer Ident: SN II
Auger I.D: 4.25 inch
Auger Head Length: 6.5 inch
Casing I.D: 4 inch
Drill Rod O.D: 2.625 inch NW
Core Barrel Type: NQ2
Core Barrel I.D/O.D: 2 inch / 3 inch
Core Barrel Length: 13.5 ft
Drilling Method: HSA to 5 ft, from 5 ft to 150 ft coring using NQ2 wireline coring.

ABBREVIATIONS:

Blows per 6 in.: 140 lb hammer falling 30 inches to drive a 2 inch O.D. split spoon sampler.
Pen. = Penetration Length
Rec. = Recovery Length
RQD = Length of Sound Cores>4 in / Pen.,%
HSA = Hollow-Stem Auger
WOR = Weight of Rods
WOH = Weight of Hammer
S = Split Spoon Sample
C = Core Sample
NA, NM = Not Applicable, Not Measured
LL = Liquid Limit
PI = Plasticity Index
NV, NP = No value, Non-plastic

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
		X	S1	12/16	2-6-50/4"	NA				S1: (0-8") SILTY SAND (SM); ~60% mostly fine to medium sand, ~40% low plasticity fines, roots, organic material, dark brown. SURFICIAL DEPOSITS. Approximate top of Glacial Till at depth 1 ft (El. 261.5 ft).
260										
			S2	0/0	50/0"	NA				S1: (8-12") SILTY SAND WITH GRAVEL (SM); ~60% mostly fine to medium sand, ~20% slightly plastic fines, ~20% fine subangular gravel, occasional fragments of Oswego Sandstone, light brown. GLACIAL TILL. S2: No recovery. Approximate top of Oswego Sandstone at depth 5 ft (El. 257.5 ft).
							Moderate weathering.			
			C1	54/54	41	3	Shaley partings.			C1: SANDSTONE, light gray, soft and medium, with numerous fractures.
						2				
						1.5	2-inch-thick weathered interval.			
	10					1.5	Inclined fracture on moderately-dipping bedding plane.			
						2				
			C2	114/120	95	2				C2: SANDSTONE, light gray, medium, with numerous fractures and trace of interbedded shale layer.
250						1				
						1.5				
						1				
						1.5	Shaley partings.			
						1				
						1				
						1	Distinct bedding.			
						1.5	Shaley partings.			
						1				
	20						Slight weathering.			
			C3	118/120	92	1	Bedding-parallel fractures.			C3: SANDSTONE, light gray, medium to hard, with numerous fractures and a few interbedded layers of shale.
240						1				
						1				
						1				
						1				
						1				
						1				
						1				
						1				
						1	Shaley partings.			
	30									
			C4	121/120	93	1				C4: SANDSTONE, light gray, medium to hard.
230						1	Massive.			
						1				
						1				

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29
Date Start / End: 9/20/2007 - 9/25/2007
Total Depth (ft) : 150.0

Boring No. **B215**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
						1.5				
						1				
						1				
						1				
						1				
						1.5				
	40									
			C5	114/120	98	1				C5: SANDSTONE, light gray, medium to hard, with some interbedded siltstone (dark gray) and some fractures.
220						1				
						1				
						1.5				
						1				
						1	Few siltstone clasts.			
						1				
						1				
						1				
						1				
	50									
			C6	120/120	91	1.5				C6: SANDSTONE, light gray, medium to hard, with a few interbedded siltstone layers, a few fractures.
210						1				
						1.5	Shaley partings.			
						1				
						1.5	Distinct bedding.			
						1.5				
						1				
						1.5				
						1.5	Moderately-dipping fracture in siltstone. Dip-slip slickensides.			
						1				Approximate top of Oswego Transition Zone at depth 60.5 ft (El. 202.0 ft).
	60									
			C7	122/120	97	1				C7: SANDSTONE, light gray/siltstone dark gray, interbedded with occasional fossil layers at about a depth of 64 ft.
200						1.5				
						1.5				
						1.5				
						2				
						1				
						1.5				
						1.5				
						1.5	Disturbed bedding (soft sediment deformation).			
						1.5				
	70									
			C8	120/120	96	1.5				C8: SANDSTONE/SILTSTONE, light to dark gray, interbedded with several layers of interbedded fossils, several fractures.
190						1.5	Clasts and laminations of siltstone.			
						2				
						1.5	Trace fossils.			
						1.5				
						1.5				
						1				
						1.5				
						1.5				
						1.5				
	80									

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

Ground Surface Elev. (ft): 263
Vertical Datum : NGVD 29
Date Start / End: 9/20/2007 - 9/25/2007
Total Depth (ft) : 150.0

Boring No. **B215**

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
										Approximate top of Pulaski Formation - Unit A at depth 81 ft (El. 181.5 ft).
180			C9	120/120	91	1 1 1 1 2 1.5 1.5 1.5 1.5 1.5	Well-lithified marine fossil debris. Disturbed bedding (soft sediment deformation).			C9: (0-60") SILTSTONE/SANDSTONE, light gray to dark gray, interbedded, with several layers of interbedded fossils, few fractures. (60" - 120") SILTSTONE, dark gray, hard, with few interbedded layers of sandstone (light to dark gray, medium to hard, few fractures.
	90									
170			C10	62/60	100	1 1 1 1 1				C10: SILTSTONE, dark gray to blackish, with a few interbedded layers of sandstone, few fractures.
	100		C11	110/120	97	1 1 1.5 1.5 1 1 1 1 1 1.5	Clasts of siltstone in sandstone. Disturbed bedding (soft sediment deformation). Fractures along moderately-dipping beds in siltstone. Clasts of siltstone in sandstone.			C11: Similar to C10, with traces of interbedded sandstone layers and some layers of fossils, a few fractures.
160										
	110		C12	120/120	94	1 1 1 1 1.5 1 1 1 1 1	Disturbed bedding (soft sediment deformation).			C12: (0-42") Similar to C10, with several interbedded fossil layers. (42"-120") SILTSTONE, dark gray to black, with a few interbedded layers of sandstone (light gray to dark gray), medium to hard, few fractures.
150										Approximate top of Pulaski Formation - Unit B at depth 115 ft (El. 147.5 ft).
	120		C13	120/120	100	3 2.5 2.5 2 2 2 2.5 2.5 2.5 2.5	Natural gas pocket at 116 ft. Drill water being forced out of top of casing. Measured gas levels above 10% LEL. Increasing sandstone bed thickness.			C13: SILTSTONE, light to dark gray, hard, with interbedded layers of shale and sandstone, few fractures.
140										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log

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Boring No.
B215

Elev. (ft)	Depth (ft)	Sample Information: Type	Sample No.	Rec./ Pen. (in)	Blows per 6 in. or RQD	Coring Time (min/ft)	Drilling Remarks and Engineering Geology Description of Rock Cores and Fractures	Fractures	Graphic Log	Soil-Sample Description Rock-Lithological Description
			C14	122/120	80	2 2 2 2.5 2.5 3 2 2 2 2.5	Moderately-dipping fracture with slickensides in siltstone. Well-lithified marine fossil debris.			C14: SILTSTONE INTERBEDDED WITH LAYERS OF SANDSTONE AND SHALE, dark gray to light gray, fractures planar and horizontal, vertical fracture at 55" approx. 25° from horizontal, sandstone hard, siltstone soft. Approximate top of Pulaski Formation - Unit C at depth 135 ft (El. 127.5 ft).
			C15	120/120	83	3 1.5 1 1 1.5 1.5 1 1.5 1 1.5	Slickensides in siltstone - dip-slip. Slickensides in siltstone - dip-slip. Slickensides in siltstone.			C15: SILTSTONE INTERBEDDED WITH SANDSTONE AND SHALE, dark gray to light gray, fracture planar and horizontal, vertical fractures at 7", 14" and 45" approx. 20° from vertical, siltstone soft, sandstone hard, contains residues of clay.
			C16	36/48	99	1 1 1 1	Shaley partings.			C16: SILTSTONE INTERBEDDED WITH LAYERS OF SANDSTONE AND SHALE, dark gray to light gray, fractures planar and horizontal, siltstone soft, sandstone hard, contains residues of clay.
										Bottom of boring at depth 150 ft (El. 112.5 ft). Borehole grouted to approx. ground surface upon completion.

Elevation scale: 130, 120, 110, 100. Depth scale: 130, 140, 150, 160, 170.

General Comments about Core Samples:

Not all sub-horizontal bedding-parallel fractures depicted in fractures column, however, RQD takes all sub-horizontal bedding-parallel fractures into account.

Bedding-parallel fractures are most frequent in shale and siltstone and less common in sandstone.

Vertical fractures occasionally present in sandstone beds.

Hand pressure produces bedding-parallel fractures in siltstone of Pulaski Formation during handling and transport.

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

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City/State: Oswego, New York
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90							Rock is hard, fresh, and unweathered unless otherwise noted. Fracture surfaces are generally unweathered unless otherwise noted.			
	180									
80										
	190									
70										
	200									
60										
	210									
50										

Notes: Engineering geology description of rock cores and fractures by Stephen Potts.
Natural gas pocket at 116 ft. Natural gas observations recorded in field book.

Project Name: Nine Mile Point Unit 3 Site Characterization
City/State: Oswego, New York
GEI Project Number: 07223

GEI Consultants

Final Boring Log Signature Page	Boring No. B215

Project: Nine Mile Point Site Characterization

GEI Project No. 07223

Location: Oswego, New York

Final Log Prepared by: Heather P. Sentatz Date: 4/7/08

Per GEI Procedure 150 rev. 1 using computer IBM Thinkpad - Product 200756U

Final Log Checked by:

Soil Descriptions Checked by: Stephen J. Schmidt Date: 4/8/08

Rock Descriptions Checked by: Mark L. Pitt Date: 4/7/08

Drilling and Sample Information Checked by: Seth M. Kenney Date: 4/8/08

Notes:

Form 150.3 rev. 1