APPENDIX 2AA
LEE NUCLEAR STATION FIELD EXPLORATION DATA

WLS COL 2.5-1 This Appendix contains geotechnical boring logs, test pit logs, SPT energy measurements, and Packer Test results that are the basis for discussion in relevant sections of 2.5. The logs and tests represent a record of subsurface conditions at the William States Lee III Nuclear Station site. Attachment 1 contains geotechnical boring logs (124 borings in total) and monitoring well construction logs (24 in total) resulting from the COL investigation as well as a key to symbols and descriptions. Attachment 2 contains the results of SPT energy measurement testing performed on the Lee Nuclear Station site. Attachment 3 contains test pit logs resulting from the COL investigation, 14 logs in total. Attachment 4 contains Packer Test results from four locations on the Lee site. Attachment 5 contains the Cone Penetrometer Test, Seismic Cone Penetrometer Test, and Pore Pressure Dissipation Test results performed on the Lee Nuclear Station site.

APPENDIX 2AA
ATTACHMENT 1 – LEE NUCLEAR STATION GEOTECHNICAL BORING LOGS AND GROUNDWATER MONITORING WELL CONSTRUCTION LOGS

WLS COL 2.5-1 This Attachment contains geotechnical boring logs resulting from the COL investigation, a list of the included borings, and keys to the symbols and descriptions used in the soil and rock boring logs. 124 borings are represented within this attachment. Monitoring well construction logs are also included in this attachment, separate from the geotechnical monitoring well logs.

Lee Nuclear Station Boring Logs Included in Appendix 2AA, Attachment 1

Geotechnical Boring Logs				Construction Logs
B-1000	B-1029	B-1060	MW-1200	MW-1200
B-1000-UD	B-1030	B-1061	MW-1200A	MW-1201
B-1000-UDA	B-1031	B-1062	MW-1201	MW-1201A
B-1000-UDB	B-1031-UD	B-1063	MW-1202	MW-1202
B-1001	B-1031-UDA	B-1064	MW-1202A	MW-1203
B-1001A	B-1032	B-1065	MW-1203	MW-1204
B-1002	B-1033	B-1066	MW-1204	MW-1204A
B-1003	B-1033-UD	B-1067	MW-1204A	MW-1205
B-1004	B-1034	B-1068	MW-1205	MW-1206
B-1004A	B-1035	B-1068-UD	MW-1206	MW-1206A
B-1005	B-1036	B-1069	MW-1207	MW-1207
B-1006	B-1037	B-1070	MW-1207A	MW-1207A
B-1006A	B-1037A	B-1070-UD	MW-1208	MW-1208
B-1007	B-1037-UD	B-1071	MW-1209	MW-1209
B-1008	B-1038	B-1072	MW-1210	MW-1209A
B-1009	B-1044	B-1073	MW-1210A	MW-1210
B-1009A	B-1045	B-1074	MW-1211	MW-1210A
B-1010	B-1045-UD	B-1074A	MW-1212	MW-1211
WLS COL 2.5-1 B-1011	B-1046	B-1075	MW-1212A	MW-1212
B-1012	B-1046-UD	B-1075A	MW-1213	
B-1013	B-1047		MW-1214	MW-1214
B-1014	B-1047-UD		MW-1214A	MW-1215
B-1015	B-1048		MW-1215	MW-1216
B-1016	B-1048-UD		MW-1216	MW-1217
B-1017	B-1049		MW-1217	MW-1218
B-1018	B-1050		MW-1218	
B-1019	B-1051			
B-1020	B-1052			
B-1021	B-1053			
B-1022	B-1053A			
B-1023	B-1053B			
B-1024	B-1053C			
B-1025	B-1053-UD			
B-1025-UD	B-1054			
B-1026	B-1055			
B-1026-UD	B-1056			
B-1027	B-1057			
B-1028	B-1058			
B-1028-UD	B-1059			

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or grave - sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures.
			GC	Clayey gravels, gravel - sand - clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 Sieve Size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amount of fines)	SM	Silty sands, sand - silt mixtures
			SC	Clayey sands, sand - clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts and with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

No.200 No.40 No.10 No.4 3/4" 3" 12"

U.S. STANDARD SIEVE SIZE

References: ASTM D 2487-00, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Soil Classification System)
ASTM D 2488-00, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

	GROUP SYMBOLS	TYPICAL NAMES
SAMPLE TYPE	SPT	Split Spoon Sample
	CME	Continuous Soil Sample
	UD	Undisturbed Sample

ABBREVIATIONS

SAA - Same As Above
NA - Not Applicable
ND - Not Determined
WOH - Weight Of Hammer

Correlation of Penetration Resistance with Relative Density and Consistency

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
< 4	Very Loose	< 2	Very Soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium Dense	4 - 8	Medium Stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very Dense	15 - 30	Very Stiff
		> 30	Hard

Datum Reference Information	
	Horizontal - SC State Plane NAD 83
	Elevation - NAVD 88

KEY TO SYMBOLS AND DESCRIPTIONS FOR SOIL LOGS

MACTEC

William States Lee III Nuclear Station

1) Note A - Water Level Data. The ground water level posted on the first page of each boring log represents the last reading taken either during drilling or directly following completion of drilling activities.

2) Suffix- Certain borings designations end in with a -A, -B, -C, -UD
   - -A, B, C, offset hole due to obstruction or abandonment at original location, each subsequent offset is given a new suffix, ascending in alphabetical order
   - -UD, Boring to obtain undisturbed samples
   - -A, angle boring (B-1001A, B-1004A)

3) Color descriptors in Lithology Section - Color code for soil and rock (e.g. 5YR 5/8) is based on Munsell Soil Color Chart (1994) designations

GENERAL NOTES FOR SOIL AND ROCK LOGS

References: Brown, E. T. (1981) Rock characterization testing and monitoring ISRM suggested methods
Hoek, E. and Brown, E. T. (1997) Practical estimates of rock mass strength
ASTM 6032-02, Standard Test Method for Determining Rock Quality Designation (RQD) of Rock Core

WEATHERING (abbreviation)	ROCK STRENGTH (abbreviation)
FRESH (F) - No visible sign of rock material weathering; perhaps slight discoloration on major discontinutiy surfaces. SLIGHTY WEATHERED (SW) - Rock mass is generally fresh with slight discoloration in rock fabric. Discontinuities are stained and may contain clay. Decomposition extends up to 1" into rock. MODERATELY WEATHERED (MW) - Less than 50% of rock is decomposed. Significant portion of rock shows discoloration and weathering effects. HIGHLY WEATHERED (HW) - Rock mass is more than 50% decomposed. Rock can be broken by hand or scraped with knife or pick. COMPLETELY WEATHERED (CW) - Rock mass is completely decomposed but rock fabric and structure may still be evident. Specimen is easily crumbled or penetrated with knife or pick. Modified from Brown (1981)	EXTREMELY WEAK (R0) - Can be indented with difficulty by thumbnail. May be friable or moldable with finger pressure. VERY WEAK (R1) - Crumbles under firm blows with point of hammer. Can be pealed by a knife. WEAK (R2) - Can be pealed or scraped by a knife with difficulty. Cannot be scratched by fingernail. Shallow indentation made by firm blow of hammer. MEDIUM STRONG (R3) - Cannot be scraped or picked with a knife. STRONG (R4) - More than one blow of geologic hammer required to fracture specimen. VERY STRONG (R5) - Specimen requires many hard blows of hammer to fracture or chip. Modified from Brown (1981), Hoek (1997)

ROCK SYMBOLS AND NAMES

ROCK		META-DIORITE		AMPHIBOLITE
		META-GRANODIORITE		QUARTZITE
		META-QUARTZ DIORITE		
		SCHIST		

DEFINITIONS

RQD = The sum of the length of intact and sound rock pieces over 100 mm in length divided by the total length of the core run, multiplied by 100% (ASTM D 6032-02)

Datum Reference Information	Horizontal - SC State Plane NAD 83
	Elevation - NAVD 88

KEY TO SYMBOLS AND DESCRIPTIONS FOR ROCK LOGS

MACTEC

William States Lee III Nuclear Station

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1000**	
Type and Diameter of Boring Hollow stem auger / HQ core / 6 inch	Boring Location Unit 1 N 1166072 E 1846189		Total Depth 151 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 581.5 feet MSL	Ground Water Depth 29 feet	Depth to Bedrock 63.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 12	Date Started 3/30/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/1/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT sandy (ML), strong brown (7.5YR 5/6), medium stiff, dry ~15% sand, some road base crushed stone gravel in upper part, asphalt pieces within sample. FILL	Begin day 3/30/06	581–578
4–5		SPT 1	6 4 3	7/18								577
6–8												576–574
9–10		SPT 2	2 2 2	12/18						SAA, soft, dry, 15-20% fine sand, minor gravel. FILL		573–572
11–13												571–569
14–15		SPT 3	2 5 5	18/18						SILT sandy, gravelly (ML), strong brown (7.5YR 5/8), dry, stiff, ~20% sand mixed in road gravel FILL		568–567
16–18											Hard rocky drilling believed to be in shot rock	566–564
19–20		SPT 4	36 40 18	14/18					SM	SAND silty, gravelly (SM), light gray (2.5Y 7/2), dry, very dense, some lithic and quartzite fragments within sample, RESIDUUM		563–562
21–23												561–559
24–25		SPT 5	7 8 8	14/18					SM	SAND silty (SM), light brownish gray (2.5Y 6/2) to greenish gray (10Y 5/1), damp, medium dense. SAPROLITE		558–557
26–28												556–554
29–30		SPT 6	9 12 10	18/18					∇	SAA, light gray (2.5Y 7/2), 41 % fines, 12% gravel, SAPROLITE	Classification based on B-1000 UDA UD-2 at 28 to 29.2 ft	553–552
31–33												551–549
34–35		SPT 7	5 11 17	18/18						SAA, strong brown (7.5YR 4/6), damp, medium dense, relict veins some root casts; SAPROLITE		548–547
36–38												546–544
39–40		SPT 8	4 12 17	18/18						SAA, light olive brown (2.5Y 5/4) to olive yellow (2.5Y 6/8), damp, medium dense SAPROLITE		543–542

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1000

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
44		SPT 9	15 37 50/2	16 / 13.5					SM	SAND silty, clayey (SM), brown (10YR 4/3), damp to moist, SAPROLITE		538
45									SM	SAND silty (SM) yellow (10YR 7/8), PARTIALLY WEATHERED ROCK		537
48											Hard drilling	534
49		SPT 10	50/5	5 / 5						SAND silty; light olive brown (2.5Y 5/6), damp, hard, >12% silts and clays. PARTIALLY WEATHERED ROCK		533
54		SPT 11	50/1	2 / 1						SAA, brownish yellow (10YR 6/8) PARTIALLY WEATHERED ROCK		528
58											At 60 ft, end of hollow stem auger, begin rock coring. Refer to rock log for continuation of boring log	524
59		SPT 12	40 50/5	11 / 11						SAA; light olive brown (2.5Y 5/6 to 2.5Y 5/4) PARTIALLY WEATHERED ROCK		523
60												522

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1000**	
Type and Diameter of Boring Hollow stem auger / HQ core / 6 inch	Boring Location Unit 1 N 1166072 E 1846189		Total Depth 151 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 581.5 feet MSL	Ground Water Depth 29 feet	Depth to Bedrock 63.5 feet
Casing Size and Depth 4 inch / 60 feet	Length of Core Barrel and Bit 13 feet / 13 feet	No. of Core Boxes 6	Date Started 3/30/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/1/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
60–63		13	0.0/3.5	0	CW	R0		No recovery; PARTIALLY WEATHERED ROCK	End of day 3/30/06 Begin day 3/31/06, begin HQ core	521–519
64–68		14	3.8/5.0	20	MW to HW	R2 to R3		META-DIORITE, dark olive gray (5Y 3/2), fine grained, numerous oxidized veins, dissolution features along veins. META-QUARTZ DIORITE, pale brown (10YR 6/3), fine to medium grained, numerous with veins of altered material and high amounts of iron oxide along dissolution features.		518–514
69–73		15	3.3/5.0	0	MW to HW	R2		META-DIORITE; massive, manganese and pyrite mineralization along majority of fracture planes		513–509
74–78		16	1.5/5.0	0	HW	R1 to R2		SAA		508–504
79–83		17	5.0/5.0	60	MW	R0 to R1		META-DIORITE yellowish brown (10YR 5/6), plagioclase phenocrysts throughout, foliation (~50°) expressed as re-mineralized veins (manganese oxide) and alignment of plagioclase crystals.		503–499
84–88		18	4.8/5.0	36	MW	R0 to R2				498–494
89–93		19	5.0/5.0	34	MW	R1 to R2 R2		SAA; yellowish brown (10YR 5/6), massive, fine grained, manganese oxide, iron oxide mineralization along majority of joint surfaces At 90.5 ft quartz diorite-granodiorite xenolith is partially exposed with epidote mineralization		493–489
94–99		20	5.0/5.0	40	MW	R2 to R3		SAA; apparent foliation between 45 to 80°, Partially Weathered Rock.		488–483
100										482

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1000

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
100–103	21	3.3/4.0	20	MW	R2 to R3		META-DIORITE, dark olive brown with oxidized zones of yellowish brown (10YR 5/6), plagioclase phenocrysts throughout, foliation (~50°) expressed as re-mineralized veins (manganese oxide) and alignment of plagioclase crystals.		481–478
103	22	1.0/1.0	11	MW	R2 to R3				478
104–106	23	5.0/5.0	88	HW	R2 to R3				477–476
106				MW	R3				475
107–108				SW	R4		SAA; greenish gray Joint between 107 and 108 ft partially healed with epidote, quartz, calcite, and plagioclase		474–473
109–113	24	5.0/5.0	44	SW	R3 to R4		Joints and healed joints are apparent foliation joints that have similar orientation and dips (40 to 70°). Calcite, and epidote (minor) mineralization along joint surfaces and within healed joints, some pitting of infilled minerals along joint surface.		472–469
114–118	25	5.0/5.0	78	F to MW	R3 to R4		SAA; bluish black (10B 2.5/1), massive, fine to very fine grained, calcite mineralization along wavy healed veins (probable foliation) CONTINUOUS ROCK	End of day 3/31/06 Begin day 4/1/06; water level at 29 ft prior to start of drilling	468–464
119–123	26	5.0/5.0	100	SW to F	R3 to R4		SAA; fine grained with plagioclase phenocrysts, plagioclase crystals appear to be elongated along a foliation oriented approximately with the calcite healed joints and veins.		463–459
124–128	27	5.0/5.0	100	SW to F	R4		SAA; very fine grained plagioclase phenocrysts.		458–454
129–133	28	5.0/5.0	100	SW to F	R4		SAA; fine grained, weakly foliated, fewer plagioclase phenocrysts than above, foliation joints are primarily healed with calcite with minor quartz and plagioclase (altered) mineralization.		453–449
134–138	29	5.0/5.0	100	SW to F	R4		SAA; some to many chalcopyrite phenocrysts, healed joints are mineralized with calcite, some quartz, minor altered plagioclase, and traces of pyrite.		448–444
139–140									443–442

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1000

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
140										441
141		30	5.0/5.5	100	F	R4		SAA; some to many chalcopyrite phenocrysts, healed joints are mineralized with calcite, some quartz, minor altered plagioclase, and traces of pyrite.		440
142										439
143										438
144								SAA		437
145										436
146										435
147		31	7.0/7.0	100	F	R4				434
148										433
149									Boring terminated at 151 ft on 4/1/06	432
150										431
151										430
152										429
153										428
154								Total Depth 151 ft. Groundwater encountered at 29 feet Borehole Grouted On 4/27/06		427
155										426
156										425
157										424
158										423
159										422
160										421
161										420
162										419
163										418
164										417
165										416
166										415
167										414
168										413
169										412
170										411
171										410
172										409
173										408
174										407
175										406
176										405
177										404
178										403
179										402
180										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1000-UD**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location Unit 1 N 1166066 E 1846192		Total Depth 23 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 581.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 0	Date Started 6/10/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/10/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drilled without sampling, refer to B-1000 boring log	Begin drilling 6/10/06	581
1												580
2												579
3												578
4												577
5												576
6										Encountered a gravel zone		575
7												574
8												573
9												572
10												571
11												570
12												569
13												568
14											Lost all water	567
15												566
16										Gravel zone drilling 16 to 21 ft		565
17												564
18												563
19												562
20												561
21											Rig racking	560
22										Refusal occurred in shot rock fill	Tricone refusal, boring terminated on 6/10/06	559
23										Boring terminated		558
24												557
25												556
26												555
27												554
28												553
29												552
30												551
31												550
32												549
33												548
34												547
35												546
36												545
37												544
38												543
39												542
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1000-UDA**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location Unit 1 N 1166062 E 1846181		Total Depth 29.2 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 581.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 6/10/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/10/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Begin B-1000 UDA drilling 6/10/06 Drilled without sampling to 23 ft	581
1												580
2												579
3												578
4												577
5												576
6											Very rocky drilling, losing water	575
7												574
8												573
9												572
10												571
11												570
12												569
13												568
14											Losing water	567
15												566
16												565
17												564
18												563
19												562
20												561
21												560
22												559
23		UD 1		7.2/24					SM	SAND silty (SM)	Shelby push from 23 to 25 ft	558
24												557
25											Drilled without sampling to 28 ft	556
26												555
27												554
28		UD 2		14.4/14.4	●	●	●		SM	SAND silty (SM); 12% gravel, 47% sand, 41% fines	Shelby push 28 to 29.2 ft Boring terminated at 29.2 ft on 6/10/06, moved to B-1000 UDB	553
29												552
30												551
31												550
32												549
33												548
34												547
35												546
36												545
37												544
38												543
39												542
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1000-UDB**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location Unit 1 N 1166107 E 1846117		Total Depth 48 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 588.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Split spoon / Undisturbed	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 10	Date Started 6/12/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/12/06

Reviewed by / Date B. Reinicker 6/12/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–1									GP	GRAVEL (GP)	Begin 6/12/06 Drilled to 28.0 ft without sampling, difficult drilling	588
1–28										No sampling from 0 to 28 ft		587–561
28–29		SPT 1A	3 10 14	14/18					SM	SAND silty (SM); strong brown (7.5YR 5/8), white (7.5YR 8/1); damp, medium dense, fine to medium grained, SAPROLITE		560
30–31		UD 1		16.8/16.8	●	●	●			SAA; 43% fines, 57% sand	Shelby push 30 to 31.4 ft. Shelby push refusal	559–558
32–33		SPT 1B	4 15 20	18/18						SAA; dense		557–556
34		SPT 2A	4 15 25	12/18								555
35–36		UD 2		13.2/24	●	●	●			42% fines, 58% sand	Changed to pitcher barrel equipment Pitcher drill 35 to 37 ft.	554–553
37–38		SPT 2B	3 14 24	18/18								552–551
39–40												550–549

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1000-UDB

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40									SM			
41											Pitcher drill 41 to 43 ft.	548
42		UD 3		8.4/24	●	●	●					547
43		SPT 3B	50/6	6/6						SAA, 2% gravel, 63% sand, 35% fines		546
44												545
45												544
46		UD 4		7.2/20.4							Pitcher drill 45 to 46.7 ft Pitcher barrel drill refusal	543
47		SPT 4B	50/5	5/5						SAA; PATIALLY WEATHERED ROCK		542
48											Tricone refusal at 48 ft on 6/12/06	541
49												540
50												539
51												538
52												537
53												536
54												535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												509

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1001**	
Type and Diameter of Boring HQ core / 3 inch	Boring Location Unit 1 N 1166067 E 1846370		Total Depth 118.1 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 565.5 feet MSL	Ground Water Depth 19 feet	Depth to Bedrock 32.9 feet
Casing Size and Depth 3.5 inch / 28.8 feet	Length of Core Barrel and Bit 8.5 feet / 8.5 feet	No. of Core Boxes 10	Date Started 5/13/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/16/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–3								CONCRETE FLOOR PRE CORED - USING THIN WALLED CORING TOOL	Upper deck slab	565–563
3–20								OPEN CORRIDOR TO LOWER COMPARTMENT ▽	Existing former Unit 1 corridor Groundwater measured at 19 ft on 5/15/06	562–546
21–24		1 2	1.9/2.3 0.8/1.1					CONCRETE PRE CORED, USING THIN WALLED CORING TOOL, rebar layer 21.1 to 21.3 ft and 23.3 to 23.5 ft, rebar diameter approximately 1 1/4 to 1 3/8 inch	Existing former Unit 1. Lower corridor slab (top)	544–542
24–32		3 4	2.3/2.3 4.9/4.9					CONCRETE ~5% void spaces up to 3/8 inch, ~50% coarse aggregate (0.75 inch) angular likely quartz diorite, ~35% fine aggregate, ~#2 coarse sand, angular.	Begin coring - HQ Cold joint in concrete at 24.77 ft.	541–533
32–36		5	4.9/4.9	49	MW	R2 to R3		META-QUARTZ DIORITE, bluish gray (10B 5/1), gray (5YR 6/1); fine to medium grained; intensely to moderately jointed, subvertical, manganese oxide and iron oxide staining, plagioclase, quartz, hornblende, biotite, irregular contact with overlying concrete. CONTINUOUS ROCK	Existing former Unit 1 lower corridor slab (bottom)	532–530
36–40		6	5.0/5.0	54	MW			38.6 ft, Joint dipping ~75°, planar, quartz in filling partially replaced with calcite, open portions 0.10 inch wide.		529–526

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–41					R3				525–524
41–42							Becomes very dark greenish gray (10YR 3/1) Continuous Rock		524–523
42–46	7	5.0/5.0	86						523–520
46–47				SW					520–519
47–51	8	5.0/5.0	95				META-QUARTZ DIORITE; bluish gray (10B 5/1) to gray (5YR 6/1)	End drilling 5/13/06; start drilling 5/14/06, water at 21 ft below top of boring	519–515
51–52							50.8 to 51.2 ft quartz vein, steeply dipping 70 to 80°, 0.1 > 0.3 thick, irregular		515–514
52–56	9	5.0/5.0	100		R3 to R4				514–510
56–61	10	4.6/4.6	100				META-QUARTZ DIORITE; bluish gray (10B 5/1) to gray (5YR 6/1); fine to medium grained; pyrite mineralization within thin to medium thick quartz vein; quartz and calcite often coupled infilled/healed joints; hornblende, plagioclase 60.1 ft 0.5 inch thick Quartz pegmatite vein with calcite and pyrite mineralization, near horizontal		510–504
61–62	11	0.4/0.4	100	F					504–503
62–65	12	4.7/4.7	94						503–501
65–71	13	5.0/5.0	94				META-DIORITE; black (N 2.5), very dark greenish gray (10Y 3/1), fine grained; quartz, pyrite, phenocrysts <50%; hornblende, calcite; porphyritic		500–497
71–76	14	5.0/5.0	100		R3 to R4				494–490
76–80	15	5.0/5.0	96				Quartz pegmatite with calcite zones; quartz with calcite		489–486

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
80–86		16	5.0/5.0	96	F			phenocrysts scattered, varying in size, shape, and orientation <50% phenocrysts		485–480
86–91		17	5.0/5.0	84	F	R4		META-QUARTZ DIORITE; bluish gray (10B 5/1), gray (5YR 6/1), black (N 2.5); fine to medium grain; plagioclase, quartz, hornblende, calcite, pyrite, altered plagioclase along some quartz-diorite contacts.		479–475
91–92		18	1.0/1.0	100	F	R4				474
92–96		19	4.0/4.0	100	F	R4		At 93 and 108 ft, Mafic inclusions (3.5 cm by 3 cm) (3.5 cm by 1 cm), respectively. At 94 ft, Pegmatite vein noted	End drilling 5/14/06; start drilling 5/15/06, water at 19 ft	473–470
96–100		20	4.0/4.0	100	F	R4				469–466
100–105		21	5.0/5.0	100	F	R4				465–461
105–110		22	4.2/4.2	100	F	R4		Mafic inclusion		460–457
110		23	1.1/1.1	100	F	R4				456
110–118		24	5.0/5.0	100	F	R4		Pyrite mineralization along subvertical healed quartz infilled joints		455–448
118–120		25	2.7/2.7	100	F	R4			Finish coring 5/15/06; 5/16/06 set 4 inch PVC casing to 28.9 ft for	447–446

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
120									geophysical logging.	445
121								Total Depth 118.1 ft.		444
122								Groundwater encountered at 19 feet		443
123								Borehole Grouted On 6/13/06		442
124										441
125										440
126										439
127										438
128										437
129										436
130										435
131										434
132										433
133										432
134										431
135										430
136										429
137										428
138										427
139										426
140										425
141										424
142										423
143										422
144										421
145										420
146										419
147										418
148										417
149										416
150										415
151										414
152										413
153										412
154										411
155										410
156										409
157										408
158										407
159										406
160										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1001A**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 N 1166085 E 1846293		Total Depth 270.8 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 568.1 feet MSL	Ground Water Depth N/A	Depth to Bedrock 49 feet
Sampling Method No sampling	Sample Driving Hammer/Drop NA / NA	No. of Samples 0	Date Started 4/29/06
	Borehole Inclination -54	Logged by R. Ortiz	Date Completed 5/9/06

Reviewed by / Date B. Reinicker 5/17/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drilled through soil without sampling. Angle boring 36° from vertical	Start drilling on 4/29/06; drilling 36° off vertical	568
1												567
2												566
3												565
4												564
5												563
6												562
7												561
8												560
9												559
10												558
11												557
12												556
13												555
14												554
15												553
16												552
17												551
18												550
19												549
20												548
21												547
22												546
23												545
24												544
25									▽			543
26												542
27												541
28												540
29												539
30												538
31												537
32												536
33												
34											Tricone refusal at 36 ft, Begin coring	
35												
36												
37												
38												
39												
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1001A**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 N 1166085 E 1846293		Total Depth 270.8 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 568.1 feet MSL	Ground Water Depth 25.1 feet	Depth to Bedrock 49 feet
Casing Size and Depth 3.5 inch / 36 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 13	Date Started 4/29/06
	Borehole Inclination -54	Logged by R. Ortiz	Date Completed 5/9/06

Reviewed by / Date B. Reinicker 5/17/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	4.9/5.0					CONCRETE	
2	5.0/5.0						
3	5.0/5.0	100					
			SW	R3 to R4		META-GRANODIORITE; bluish gray (10B 6/1); massive; fine to medium grained; ~15% K-spar CONTINUOUS ROCK	Concrete/rock contact ~80 to 90% water loss RQD value of run 3 applies to rock only
4	4.9/5.0	71	SW to MW	R3 to R4			
			SW to MW	R2		META-DIORITE to AMPHIBOLITE; very dark gray (N 3); massive to weakly foliated; very fine grained; infilled joint with quartz, calcite, and feldspars at 54 ft	
5	4.9/5.0	83	MW to SW	R2			
				R3 to R4		META-GRANODIORITE; bluish gray (10B 6/1); massive; fine to medium grained; ~15% K-spar	
6	4.6/5.0	100	SW	R3 to R4			63.5 to 64.75 ft. void attributed to rock excavation
7	5.0/5.0	98	SW to F	R4		META-GRANODIORITE to META-QUARTZ DIORITE; bluish gray (10B 6/1 to 5PB 4/1); massive; fine to medium grained; occasional healed shears with numerous randomly oriented mafic xenoliths.	End day 4/29/06 Start day 4/30/06
8	5.0/5.0	99	SW to F	R4			

Depth (feet): 36–76; Elevation (feet): 538–507

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001A

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
76–81	9	4.6/5.0	90	SW to F	R4		META-QUARTZ DIORITE; dark bluish gray (10B 4/1); fine to medium grained; large quartz veins Very large quartz vein		506–503
81–86	10	4.9/5.0	87	SW to F	R4		Well developed mylonitized zone, pyrite, is highly mineralized with quartz, calcite and other minerals along large, thick (>1.5 inch) quartz, calcite vein that runs vertically from 81.4 to 83.8 ft	Losing ~80% of water	502–499
86–91	11	4.9/5.0	98	F	R4		Some healed minor brecciation along quartz infilled mylonitized zone		498–495
91–96	12	4.9/5.0	94	F	R4				494–491
96–101	13	5.0/5.0	100	F	R4		META-QUARTZ DIORITE to META-GRANODIORITE; very dark bluish gray (10B 3/1); fine to medium grained; massive to very weakly foliated; mylonitic rock fabric along healed joints	~75 to 80% water loss	490–487
101–106	14	5.0/5.0	94	F	R4		META-QUARTZ DIORITE; very dark bluish gray (10B 3/1); fine to medium grained; massive to very weakly foliated; mylonitic rock fabric along healed joints		486–483
106–111	15	4.9/5.0	98	F	R4				482–479
111–116	16	5.0/5.0	85	SW to F	R4			~80% water loss	478–475

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001A

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
116–121	17	5.0/5.0	100	F	R4		META-QUARTZ DIORITE; bluish gray (10B 5/1); mylonitic rock fabric along healed joints	End day 4/30/06 Start day 5/1/06; water level at 25 ft along inclined hole length	474–471
121–126	18	5.0/5.0	100	F	R4		META-GRANODIORITE; bluish gray (10B 5/1); fine to medium grained; ~15% K-spar		470–467
126–136	19	4.9/5.0	98	SW to F	R4		META-GRANODIORITE to META-QUARTZ DIORITE; fine to medium grained; massive to very weakly foliated; with mylonitic rock fabric along healed joints	~75% water loss	466–458
131–136	20	5.0/5.0	100	F	R4				462–458
136–141	21	5.0/5.0	95	F	R4		META-GRANODIORITE; bluish gray (10B 5/1); fine to medium grained; massive to weakly foliated; some mafic xenoliths within core		458–454
141–143							META-GRANODIORITE to META-QUARTZ DIORITE; SAA		454–453
143–146	22	4.6/5.0	92	F	R3 to R4		META-DIORITE; greenish black (10G 2.5/1); very fine to fine grained; weakly foliated; contact with granodiorite is vertical along core axis; plagioclase phenocrysts Quartz vein; wavy	~75% water loss	453–450
146–151	23	4.9/5.0	98	F	R3 to R4		Vein of meta-granodiorite between 149.2 to 150 ft		450–446
151–156	24	5.0/5.0	100	F	R4				446–442

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
25	5.4/5.4	100	F	R4			
26	4.4/5.0	88	F	R4			
27	2.6/2.6	100	F	R4		META-GRANODIORITE; bluish gray (5PB 6/1); fine to medium grained; massive	
28	2.4/2.4	100	F	R3 to R4		META-DIORITE; greenish black (10G 2.5/1); massive to very weakly foliated; very fine to fine grained; few calcite veins	
29	5.0/5.0	86	SW to F	R3		SAA; dark greenish gray (5G 4/1); fine grained; more visible plagioclase Xenolith of meta-granodiorite	End day 5/1/06 Start day 5/2/06; water level at 26 ft along inclined hole length
30	4.9/5.0	98	SW to F	R3			
31	5.6/5.6	100	SW to F	R3		META-DIORITE; greenish gray (5G 4/1); fine grained; massive; along calcite healed fractures	~80% water loss
32	5.0/5.0	100	SW to F	R3			
33	5.0/5.0	100	SW to F	R3		Plagioclase phenocrysts	

Depth (feet): 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196

Elevation (feet): 441, 440, 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419, 418, 417, 416, 415, 414, 413, 412, 411, 410

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
196										409
197										408
198		34	5.0/5.0	100	SW to F	R3				407
199										406
200										405
201									~75 to 80% water loss	404
202										403
203		35	5.0/5.0	100	SW to F	R3				402
204										401
205										400
206										399
207										398
208		36	3.2/3.5	92	SW to F	R3 to R4		META-QUARTZ DIORITE; bluish gray (5PB 6/1); fine to medium grained; massive to very weakly foliated	Drilling getting harder	397
209										396
210										395
211		37	1.1/1.1	90	F	R4				394
212		38	5.4/5.4	100	F	R4		Some mafic xenoliths	End day 5/2/06 Start day 5/3/06. No hole advance Start day 5/8/06. Start hole advance	393
213										392
214										391
215										390
216										389
217										388
218		39	4.9/5.0	95	F	R4				387
219										386
220										385
221								Zone of healed brecciation between 220.5 to 222 ft		384
222										383
223		40	2.6/2.6	100	F	R4				382
224										381
225		41	2.4/2.4	100	F	R4		META-QUARTZ DIORITE to META-GRANODIORITE; bluish gray (5PB 5/1); massive to very weakly foliated; slight increase in K-spar		380
226								Quartz pegmatite vein		379
227		42	1.4/1.4	100	SW to F	R4		SAA; large amount of altered plagioclase and chlorite along fracture planes		378
228		43	1.0/1.1	91	SW to F	R4		SAA		377
229		44	2.4/2.5	96	SW to F	R3 to R4		META-GRANODIORITE to META-QUARTZ DIORITE; fine to medium grained; moderate foliation; with some areas of healed highly altered mylonitic texture; highly altered plagioclase and chlorite	End day 5/8/06 Start day 5/9/06; water level at 25.1 ft along inclined hole length	376
230										375
231										374
232										373
233		45	5.0/5.0	100	F	R4		META-QUARTZ DIORITE; bluish gray (5PB 5/1); fine to medium grained; massive to weakly foliated; some healed shear zones at 0 to 70°; some mafic xenoliths		372
234										371
235									~75% water loss	370
236										369

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1001A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
236										377
237										376
238										375
239		46	5.0/5.0	100	F	R4				374
240								Zone of sheared rock and quartz vein between 240 and 242 ft		373
241										372
242								SAA; with mylonitized zones darkens color to very dark bluish gray (5PB3/1); some chlorite mineralization along quartz veins		371
243		47	4.7/5.0	94	F	R4				370
244										369
245										368
246										367
247		48	4.4/4.6	87	SW to F	R3 to R4		META-QUARTZ DIORITE; bluish gray to very dark bluish gray (5PB 5/1 to 3/1); fine to medium grained; massive to weakly foliated; many quartz veins (0 to 90°) with minor mylonitic textured around veins		366
248										365
249										364
250		49	4.3/4.4	64	SW to F	R4		SAA; quartz veins at 255 ft. predominantly		363
251										362
252									Water return	361
253										360
254		50	1.0/1.0	0	SW to F	R3 to R4		SAA; very dark bluish gray (5B 3/1); with quartz veins		359
255										358
256		51	5.0/5.0	89	SW to F	R4		META-QUARTZ DIORITE to META-GRANODIORITE; bluish gray (5PB 5/1); to very dark bluish gray (5PB 3/1); fine to medium grained; massive to slightly foliated; with mylonitic fabric along healed joints		357
257										356
258										355
259		52	5.0/5.0	76	SW to F	R4		META-QUARTZ DIORITE; dark bluish gray (5PB 4/1); massive to weakly foliated; some mafic xenoliths		354
260										353
261										352
262		53	3.8/3.8	100	F	R4				351
263										350
264										349
265									Coring terminated on 5/9/06	348
266										347
267								Total Depth 270.8 ft. Groundwater encountered at 25.1 feet Borehole Grouted On 5/10/06		346
268										345
269										
270										
271										
272										
273										
274										
275										
276										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1002**	
Type and Diameter of Boring HQ core / 3 inch	Boring Location Unit 1 N 1166061 E 1846444		Total Depth 170.3 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 565.338 feet MSL	Ground Water Depth 21.5 feet	Depth to Bedrock 29.8 feet
Casing Size and Depth 4.5 inch / 25 feet	Length of Core Barrel and Bit 10 feet	No. of Core Boxes 13	Date Started 5/23/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 5/28/06

Reviewed by / Date F. Syms 5/30/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0								Rig positioned on fabricated steel deck, coring performed in existing lower compartment approximately 21 ft below top of slab/deck	No sampling from 0 to 21 ft	565
21		1	2.5/2.5					▽ CONCRETE 1 1/4 to 1 3/8 inch rebar from 21.2 to 21.5 ft 5/8 inch rebar at 23.2 to 23.3 ft 1 1/4 inch rebar at 23.4 to 23.5 ft	Concrete pre-cored using thin wall core to 24.75 ft	544
24		2	1.2/1.3						Cold joint in concrete	541
25		1	3.8/4.3					CONCRETE	Start HQ core drilling on 5/23/06	540
29		2	0.7/0.8							536
30		2	4.2/4.2	81	F	R4 to R5		META-GRANODIORITE; light bluish gray (10B 7/1); medium to coarse grained; equigranular CONTINUOUS ROCK	End of concrete at 29.8 ft Top of rock	535
34		3	0.8/1.0	0	SW to F	R3				531
37		4	4.0/4.0	87	F	R4				528
40										526

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1002

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–44		5	5.0/5.0	95	F	R4 to R5				525–521
44–49		6	4.9/5.0	96	F	R4 to R5				521–516
49–54		7	5.0/5.0	94	F	R4 to R5		META-GRANODIORITE; light bluish gray (10B 7/1), medium-coarse grained, equigranluar 51.9 ft, vein 0.5 inch white quartz, 45° inclination		516–511
54–59		8	4.7/5.0	81	F	R4 to R5				511–506
59–64		9	5.0/5.0	89	F	R4 to R5		61.3 to 62.2 ft, vein 0.5 inch quartz and feldspar infilled		506–501
64–68		10	4.0/4.0	100	F	R4 to R5				501–497
68–69		11	1.0/1.0	100	F	R4 to R5				497–496
69–71		12	5.0/5.0	100	F	R4 to R5				496–494
71–74		12				R2 to R3		META-DIORITE; bluish gray (5B 5/1); fine grained; equigranular; well defined foliation contact with metagranodiorite deformed - ductile flow (exhibits migmatitic fabric); calcite veins parallel to foliation 40° From 74.7 to 75 ft, meta-granodiorite - xenolith	End of day 5/23/06 Begin day 5/24/06	494–491
74–77		13	5.0/5.0	100	F	R2 to R3				491–488
77–80		13				R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1); medium to coarse grained; equigranular		488–486

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ROCK LOG - Boring No. B-1002

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
14	4.0/4.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1), medium to coarse grained, equigrangluar	
15	1.0/1.0	100	F	R4 to R5			
16	5.0/5.0	100	F	R4 to R5		84.4, to 85.0 ft, 0.5 inch vein, potassium feldspar pegmatite. META-GRANODIORITE; SAA, with pyrite flecks and inclusions	
17	4.4/4.4	100	F	R4 to R5			
18	5.6/5.6	88	F	R4 to R5			
				R3 to R4		META-DIORITE; bluish gray to dark bluish gray (10B 5/1 to 10B 4/1); fine to medium grained; equigranular; pervasive healed calcite veins inclined at 30 to 60º	
19	5.0/5.0	100	F	R3 to R4		101.6 ft, 0.3 inch, calcite vein, 30-40°	
20	5.0/5.0	98	F	R3 to R4			
21	5.0/5.0	100	F	R3 to R4 R4			
22	5.0/5.0	100	F	R4			

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ROCK LOG - Boring No. B-1002

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
23	5.0/5.0	96	F	R4			
24	5.0/5.0	96	F	R4		META-DIORITE, bluish gray to dark bluish gray (10B 4.5/1), fine to medium grained, equigranular, pervasive white veining random orientation	
25	1.9/2.0	90	F	R4			End day 5/24/06 Begin day 5/26/06
26	2.3/2.3	87	F	R4			
				R4 to R5		META-GRANODIORITE; light bluish gray (5PB 6/1); medium grained; equigranular	
				R4 to R5			
27	5.5/5.7	96	F	R4		META-DIORITE; bluish gray to dark bluish gray (10B 4/1 to 10B 5/1); fine grain, equigranular, pervasive calcite veining	
28	1.0/1.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 5/1); medium grained; equigranular	
29	1.0/1.0	100	F	R4 to R5			
30	2.8/3.0	93	F	R4		META-DIORITE; bluish gray to dark bluish gray (10B 4/1 to 10B 5/1); fine to medium grained; equigranular; pervasive calcite veining	End of day 5/26/06 Begin day 5/27/06
31	3.1/4.2	64	F	R4 to R5		META-GRANODIORITE; light bluish gray (10B 4.5/1); fine to medium grained; equigranular; pervasive calcite veining	RQD 144 to 148.2 ft artificially low due to drilling induced core breakage
32	0.8/0.8	100	F	R4 to R5			
				R4 to R5			
				R4		META-DIORITE dike, migmatitic fabric	
33	4.7/5.0	92	F	R4 to R5		153.0 ft, Quartz vein 60° dipping, 0.2 inch thick	
34	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 6/1) ; medium grained; equigranular	
				R4		META-DIORITE; bluish gray to dark bluish gray (10B 4/1 to 10B 5/1); fine to medium grained; equigranular; pervasive calcite veining, migmatitic fabric along contact with upper metagranodiorite	
				R4			

Depth (feet): 120–160. Elevation (feet): 445–406.

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ROCK LOG - Boring No. B-1002

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
35	3.7/3.7	97	F	R4 to R5		159.8 ft, quartz vein, 1 inch thick, dipping 25° META-GRANODIORITE; light bluish gray (5PB 6/1); medium grained; equigranular	
36	1.3/1.3	100	F	R4 to R5			
37	2.9/2.9	91	F	R4 to R5			
38	1.8/1.8	100	F	R4 to R5			End of day 5/27/06 Begin day 5/28/06
39	1.0/1.0	100	F	R4 to R5			
40	0.6/0.6	100	F	R4 to R5			Boring terminated at 170.3 ft on 5/28/06 water at 21.5 ft

Total Depth 170.3 ft.
Groundwater encountered at 21.5 feet
Borehole Grouted On 6/13/06

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1003**	
Type and Diameter of Boring HQ core / 6 inch	Boring Location Unit 1 N 1165938 E 1846226		Total Depth 100.0 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 597.2 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock 64 feet
Sampling Method No sampling	Sample Driving Hammer/Drop NA / NA	No. of Samples 0	Date Started 4/2/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/3/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										No sampling. 6 inch tricone wash drilling to 56 ft.	Begin drilling 4/2/06	597
1												596
2												595
3												594
4												593
5												592
6												591
7												590
8												589
9												588
10												587
11												586
12												585
13												584
14												583
15												582
16												581
17												580
18												579
19												578
20												577
21												576
22												575
23												574
24												573
25												572
26												571
27												570
28												569
29												568
30												567
31												566
32												565
33												564
34												563
35												562
36												561
37												560
38												559
39												558
40												

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1003

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										No sampling. 6 inch tricone wash drilling to 56 ft. *(Continued from previous page)*		557
41												556
42												555
43												554
44												553
45												552
46												551
47												550
48												549
49												548
50												547
51												546
52												545
53												544
54												543
55										Switched to HQ rock coring.		542
56										Refer to rock log for description		541
57												540
58												539
59												538
60												537
61												536
62												535
63												534
64												533
65												532
66												531
67												530
68												529
69												528
70												527
71												526
72												525
73												524
74												523
75												522
76												521
77												520
78												519
79												518
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1003**	
Type and Diameter of Boring HQ core / 6 inch	Boring Location Unit 1 N 1165938 E 1846226		Total Depth 100 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 597.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock 64 feet
Casing Size and Depth 4 inch / 56 feet	Length of Core Barrel and Bit 13 feet / 13 feet	No. of Core Boxes 4	Date Started 4/2/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/3/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
56–64		1	2.8/3.0					CONCRETE	Tricone refusal at 56 ft, begin HQ rock core	541–533
59–64		2	5.0/5.0						100% water loss	538–534
64–68		3	3.7/3.7	86	SW	R3		META-QUARTZ DIORITE; light gray (10R 7/1); fine to medium grained; massive; zone of increased weathering (oxidation: 64 to 64.6 ft and 66.8 to 67.7 ft); some minor dissolution features (pits) along healed joints. CONTINUOUS ROCK	Bottom of concrete, top of rock 100% water loss	533–530
68–69		4	1.3/1.3	100	SW	R3				529–528
69–74		5	5.0/5.0	97	SW	R3		SAA; plagioclase, quartz, and biotite are predominant minerals; some pyrite found filling small void spaces Zone of increased oxidation 72.4 to 73.4 ft		527–524
74–79		6	5.0/5.0	83	SW	R3		META-QUARTZ DIORITE to META-GRANODIORITE; gray (N 5), massive, fine grained, zones of oxidation along joint planes, large (1 to 2 inch) quartz pegmatite veins below 77.3 ft, some mafic xenoliths also present.		523–519
79–80		7	1.8/1.8	100	SW to F	R3 to R4		SAA		518–517
80–84		8	3.0/3.2	96	SW to F	R3 to R4		SAA, with minor dissolution (vugs, pits) features along healed joints		516–513
84–89		9	4.9/5.0	94	SW	R3 to R4		SAA; fine to medium grained; some oxidation near joint surfaces; some altered plagioclase along totally to moderately healed joints Minor dissolution pits at 86 ft. (coated with calcite and iron oxide)		512–509
89–94		10	4.7/5.0	86	SW	R3 to R4				508–503
94–96										502

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1003

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
96										501
97		11	6.0/6.0	94	SW to F	R3 to R4		SAA; plagioclase, quartz, biotite, major minerals. No oxidation (iron staining) prevalent near joint surface.		500
98										499
99										498
100									Boring terminated at 100 ft on 4/3/06	497
101										496
102										495
103										494
104										493
105										492
106										491
107										490
108										489
109										488
110										487
111										486
112										485
113										484
114										483
115										482
116										481
117										480
118										479
119										478
120										477
121										476
122										475
123										474
124										473
125										472
126										471
127										470
128										469
129										468
130										467
131										466
132										465
133										464
134										463
135										462
136										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1004**	
Type and Diameter of Boring NQ / HQ core / 4 inch	Boring Location Unit 1 N 1165831 E 1846407		Total Depth 175 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 559 feet MSL	Ground Water Depth 9.5 feet	Depth to Bedrock 6.7 feet
Casing Size and Depth none / 0 feet	Length of Core Barrel and Bit 13 feet / 13.5 feet	No. of Core Boxes 14	Date Started 5/12/06
	Borehole Inclination -90	Logged by R. Ortiz/G. Maximov	Date Completed 5/22/06

Reviewed by / Date F. Syms 6/12/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–1	1	2.9/3.0					CONCRETE; 6 inches concrete core drilled and removed by thin wall bit.		559–558
1–3							CONCRETE	Begin rock core drilling at 3.0 ft. Begin coring 5/12/06	558–556
3–7	1	5.4/5.4	76						556–552
7–8				SW	R3 to R4		META-QUARTZ DIORITE; bluish gray (5PB 5/1); massive; fine to medium grained; minor healed shears; some mafic xenoliths CONTINUOUS ROCK	RQD is applicable to rock only	552–551
8–9	2	1.6/1.6	100	SW	R3 to R4				551–550
9–12	3	4.9/5.0	93	SW	R3 to R4	CKE-02 CKE-01		Goodman Jack Tests: 12.22 to 12.89 ft 13.22 to 13.89 ft	550–547
12–15									547–544
15–18	4	4.7/5.0	86	SW	R3 to R4		SAA; dark bluish gray (5PB 4/1); slightly to moderately sheared with minor brecciation healed	End 5/12/06 Start 5/13/06; water level at 12 ft	544–541
18–20									541–539
20–23	5	4.3/4.3	87	SW	R4	CKE-04 CKE-03		Goodman Jack Tests: 22.22 to 22.89 ft 23.22 to 23.89 ft	539–536
23–25									536–534
25–28	6	5.1/5.7	90	SW	R4		SAA; dark bluish gray to bluish gray (5PB 4/1 to 5PB 5/1)	End 5/13/06 Start of day 5/14/06 100% water loss	534–531
28–30									531–529
30–33	7	5.1/5.2	94	SW to F	R4	CKE-06 CKE-05	SAA; bluish gray (5PB 5/1)	Goodman Jack Tests: 32.89 to 33.56 ft 33.89 to 34.56 ft	529–526
33–35									526–524
35–38	8	5.2/5.2	85	SW to F	R4				524–521
38–40							From 39.2 to 40.2 ft zone of healed brecciation		521–519

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	2.5/2.5	100	F	R4			100% water loss
10	2.8/2.8	88	F	R4	CKE-08 CKE-07		Goodman Jack Tests: 43.64 to 44.31 ft 44.64 to 45.31 ft
11	2.7/2.9	90	F	R4			End of day 5/14/06 Start of day 5/15/06
12	4.8/5.0	86	F	R4		META-QUARTZ DIORITE to META-GRANODIORITE	
13	2.4/2.5	100	F	R4		SAA; bluish gray (5PB 5/1); massive; fine to medium grained; with boudenage structures expressed along healed shears quartz vein	
14	2.4/2.5	88	F	R4			
15	4.6/5.0	85	SW to F	R4			
16	4.9/5.0	91	F	R4			
17	4.8/5.0	96	F	R4		META-QUARTZ DIORITE; dark bluish gray (5PB 4/1); fine to medium grained; pervasive shear fabric overprints original igneous texture; some zones of highly brecciated material but main texture appears predominantly mylonitic as opposed to brecciated	
18	4.0/4.0	100	F	R4			

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
80–83	19	5.8/6.0	100	F	R4				479–476
84–88	20	4.8/5.0	78	SW to F	R3 to R4				475–471
89–90	21	2.5/2.5	100	F	R4			End of day 5/15/06 Start of day 5/16/06 Water level at 11.1 ft	470–469
91–93	22	2.4/2.5	96	F	R4		SAA; very dark bluish gray to dark bluish gray (10B 3/1 to 10B 4/1); massive to moderately sheared; fine to medium grained Mafic dike at ~ 91.3 to 91.6 ft	100% water loss	468–466
94–98	23	5.0/5.0	100	F	R4				465–461
99–103	24	5.0/5.0	88	F	R4		SAA; dark bluish gray (10B 4/1); slightly sheared (healed) with some brecciation (healed) and minor mylonitization		460–456
104–105	25	1.5/1.5	98	F	R4				455–454
106–108	26	3.4/3.5	93	F	R4				453–451
109–113	27	4.8/5.0	96	F	R4				450–446
114–118	28	5.0/5.0	98	F	R3 to R4		META-DIORITE; greenish black (10BG 2.5/1); massive to very weakly foliated; very fine to fine grained		445–441
119–120									440–439

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
29	5.2/5.2	85	SW to F	R3			
30	4.5/4.5	90	F	R3 to R4		META-QUARTZ DIORITE; bluish gray (5PB 5/1); massive to slightly sheared (healed); fine to medium grained; some minor mafic xenoliths	
31	3.8/3.8	100	F	R4			
32	1.5/1.5	88	F	R4			
33	4.7/5.0	94	F	R4			End of day 5/16/06 Start of day 5/17/06; water level at 12 ft
34	5.0/5.0	100	F	R4			
35	3.0/3.0	89	F	R4			
36	1.9/2.0	95	F	R4		META-QUARTZ DIORITE to META-GRANODIORITE; bluish gray (5PB 5/1); massive; fine to medium grained; some mafic xenoliths; slight increase in K-spar content	100% water loss
37	4.9/5.0	98	F	R4			
38	3.3/3.5	94	F	R4			
39	1.5/1.5	100	F	R4			

Depth (feet): 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160

Elevation (feet): 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419, 418, 417, 416, 415, 414, 413, 412, 411, 410, 409, 408, 407, 406, 405, 404, 403, 402, 401, 400, 399

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
160										399
161		40	4.0/4.0	100	F	R4				398
162										397
163									End of day at 5/17/06	396
164									Start day 5/22/06; water level at 9.5 ft	395
165		41	6.0/6.0	100	F	R4				394
166										393
167										392
168										391
169										390
170		42	4.0/4.0	100	F	R4				389
171										388
172										387
173		43	0.6	100	F	R4				386
174		44	0.6 / 1.8	100	F	R4				385
175			1.8						Coring terminated on 5/22/06	384
176										383
177										382
178								Total Depth 175 ft.		381
179								Groundwater encountered at 9.5 feet Borehole Grouted On 4/4/07		380
180										379
181										378
182										377
183										376
184										375
185										374
186										373
187										372
188										371
189										370
190										369
191										368
192										367
193										366
194										365
195										364
196										363
197										362
198										361
199										360
200										359

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1004A**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 N 1165831 E 1846430		Total Depth 284.7 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 559 feet MSL	Ground Water Depth 14 feet	Depth to Bedrock 7 feet
Casing Size and Depth 4 / 3.5 feet	Length of Core Barrel and Bit 13 feet / 13 feet	No. of Core Boxes 16	Date Started 4/14/06
	Borehole Inclination -56	Logged by R. Ortiz/E. Weldon	Date Completed 4/28/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	3.4/3.4					CONCRETE removed with 6-inch thin wall bit from 0 to 3.4 ft. NQ core began at 3.4 ft.	
1	3.1/3.1						Start coring 4/14/06
2	3.4/4.0	20	SW	R3		META-DIORITE; very dark gray (N 3) to very dark greenish gray (10Y 3/1); massive, fine to medium grained; some healed fractures (calcite/quartz).	Bottom of concrete, top of rock 100% water loss
3	5.0/5.0	100	SW to F	R3		SAA; greenish gray (10BG 5/1); some plagioclase phenocrysts, calcite healed fractures. CONTINUOUS ROCK	
4	5.0/5.0	72	SW	R3 to R4		SAA; massive to weakly foliated; plagioclase and mafic phenocrysts are evenly disbursed from sample	End 4/14/06 Start of day 4/17/06 100% water loss to formation
5	4.3/5.0	77	SW	R3 to R4			
6	4.5/5.0	86	SW	R3 to R4			60% loss of water to formation
7	5.0/5.0	83	MW to SW	R3 to R4		Pegmatitic texture between 30.5 and 31.8 ft.	
8	5.0/5.0	99	SW	R3 to R4			

Depth (feet): 0–40; Elevation (feet): 559–526

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	4.8/5.0	95	SW	R3 to R4			
10	2.2/2.5	30	SW	R3		META-GRANODIORITE; bluish gray (5PB 5/1); massive, fine to medium grained, very highly fractured	
11	2.5/2.5	82	SW	R3		SAA; some mafic xenoliths; few quartz veins (pegmatite)	100% water loss to formation
12	4.5/5.0	74	SW	R3 to R4			
13	5.0/5.0	84	SW	R3 to R4		Quartz pegmatite vein brittle-ductile flow structures present	
14	4.8/5.0	96	SW	R3 to R4			
15	5.0/5.0	81	SW	R4		META-DIORITE; greenish gray (10BG 5/1); fine grained; massive to weakly foliated	
16	5.0/5.0	100	SW	R4		META-GRANODIORITE; bluish gray (5PB 5/1); fine to medium grained; massive; mafic xenoliths; some quartz rich veins (pegmatites); some minor brittle-ductile flow structures with little to some displacements.	100% water loss to formation
17	5.0/5.0	100	SW to F	R4 to R5			

Depth (feet): 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80

Elevation (feet): 525, 524, 523, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500, 499, 498, 497, 496, 495, 494, 493

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
18	1.0/1.0	0	SW	R3 to R4			End of drilling 4/17/06 No hole advance 4/18/06 Start 4/19/06
19	4.0/4.0	100	SW to F	R4			
20	4.9/5.0	84	SW to F	R4		META-DIORITE; black, light orange gray; inequigranular 15 to 30% mafics, 30 to 50% feldspar,10% quartz, occasional xenoclasts of older mafic fine grained metadiorite or amphibolite? (2cm); albite? blue translucent subrounded crystals	100% water loss to formation
21	5.2/5.2	100	SW to F	R4		META-QUARTZ DIORITE; as above increased veins and healed shears in lower part of run. Fabric appears both pegmatitic and migmatitic, grains crushed with brecciated appearance.	End of day on 4/19/06 Begin day 4/24/06; E. Weldon, rig geologist
						META-QUARTZ DIORITE to META-GRANODIORITE; veins are pegmatitic (very coarse quartz, chlorite, k-spar) minor pyrite.	100% water loss
22	5.0/5.0	100	F	R4			
23	5.1/5.1	88	SW to F	R4		As above, upper foot has pegmatitic texture chloride, quartz, plagioclase and orthoclase rich veins or xenoclasts, also large 5cm mafic xenoclasts are incorporated in the more dioritic groundmass.	
24	3.9/4.0	95	F	R4 to R5		META-DIORITE with META-GRANODIORITE as above; large vein or dike (<1 ft) (feldspar rich) cuts upper 1.5 ft. Several quartz veins parallel to rock fabric.	Drilling slowly
25	6.1/6.1	95	F	R4 to R5		META-GRANODIORITE similar to above; brecciated, healed joints and flow structures. Veins (quartz) truncated by healed joints.	
26	4.9/4.9	62	F	R4		META-GRANODIORITE to META-DIORITE Coarsely foliated (alternating mafic/felsic meta grains diorite above upper 6 inches). Meta granodiorite appears migmatized above contact (2 inches) AMPHIBOLITE dark gray, equigranular, fine grained, >70% mafics	

Depth (feet): 80–120; Elevation (feet): 492–460

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
27	5.0/5.0	100	F	R4		META-GRANODIORITE; compositional banding and pervasive healed joints dipping 40°.	
28	5.0/5.0	96	F	R4		META-GRANODIORITE to META-QUARTZ DIORITE fabric ranges from predominately brecciated (coarsely) to finely mylonitized zones. Moderately spaced to very closely spaced fractures and healed joints. Veins of quartz (with minor calcite and chlorite, pegmatitic) moderately to widely spaced.	
29	4.9/5.0	92	F	R4		SAA	
30	5.0/5.0	100	F	R4		Partially migmatized; quartz veins appear to cut granodiorite component but more mafic mylonitized (meta-quartz diorite) component appears to flow around veins.	
31	4.7/5.0	94	F	R4			
32	5.0/5.0	94	F	R4			
33	4.0/5.0	99	F	R4			
34	5.0/5.0	100	F	R4			

Depth (feet): 120–160; Elevation (feet): 459–427

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
160										426
161		35	4.7/4.7	100	SW to F	R4		META-GRANODIORITE; dark bluish gray (5PB 4/1), massive to poorly foliated, some mafic xenoliths and quartz pegmatite veins.		425
162										424
163										423
164										422
165										421
166		36	5.0/5.0	100	SW to F	R4		SAA; fine to medium grained, some partly healed incipient joints healed with calcite; some minor flow structures observed.	End day 4/24/06 No hole advance 4/25/06 Start of day 4/26/06; R. Ortiz, rig geologist	420
167										419
168										418
169										417
170										416
171		37	5.0/5.0	85	SW to F	R4		META-GRANODIORITE to META-QUARTZ DIORITE, dark bluish gray, massive to weakly foliated, little to no K-spar, increase in plagioclase from above, fine to medium grained.		415
172										414
173										413
174										412
175										411
176		38	4.9/5.0	84	SW to F	R4		SAA, offset quartz pegmatite vein within upper 6 inches of core, upper 1.5 ft of core has an apparent 30° foliation.		410
177										409
178										408
179										407
180										406
181		39	4.8/5.0	96	F	R4		META-GRANODIORITE to META-QUARTZ DIORITE; dark bluish gray (5PB 4/1); fine to medium grained, massive to very weakly foliated, minor epidote and chlorite along migmatitic zone.		405
182										404
183										403
184										402
185										401
186		40	5.0/5.0	96	F	R4				400
187										399
188										398
189										397
190										396
191		41	5.3/5.3	90	SW to F	R4		META-GRANODIORITE; dark bluish gray, fine to medium grained, massive, possibly very weak foliation (~10 to 12% K-spar), some mafic xenoliths, minor flow structures appears to be mineralized with calcite.		395
192										394
193										
194										
195										
196		42	5.0/5.0	97	SW to F	R4		SAA; dark bluish gray (5PB 4/1); some small (2 to 3 cm) mafic xenoliths; some thin (<1 cm) migmatitic zones healed with chlorite.	100% water loss to formation	
197										
198										
199										
200										

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
200									393
201	43	4.9/5.0	94	F	R4				392
202									391
203									390
204									389
205									388
206	44	2.5/2.5	81	MW SW F	R3 R4 R4		META-QUARTZ DIORITE; dark to bluish gray (5PB 4/1) to bluish gray (5PB 6/1); fine to medium grained; slightly weathered, massive; some oxidation stains within areas of moderate weathering		387
207									386
208	45	2.5/2.5	72	SW to F	R4				385
209									384
210	46	4.9/5.0	95	SW to F	R4		META-QUARTZ DIORITE; dark bluish gray (5PB 4/1); fine to medium grained; massive; some zones with minor migmatitic fabric, much more fine grained material than the meta quartz diorite described above.	End 4/26/06 Start of day 4/27/06	383
211									382
212									381
213	47	5.0/5.0	95	SW to F	R4				380
214									379
215									378
216	48	5.0/5.0	94	F	R4		META-DIORITE to META-QUARTZ DIORITE; very dark greenish gray (10GY 3/1); very fine grained to fine grained with some medium grained quartz crystals, massive to very weakly foliated, many large quartz pegmatitic veins throughout, may be heavily altered quartz diorite. Quartz veins have some K-spar and calcite.		377
217									376
218									375
219									374
220									373
221									372
222	49	5.0/5.0	90	SW to F	R4		Thick quartz pegmatitic vein with associated breccia derived from quartz diorite. META-QUARTZ DIORITE; fine to medium grained with mafic xenoliths; massive to very weakly foliated.		371
223									370
224									369
225									368
226	50	5.0/5.0	88	F	R4		META-QUARTZ DIORITE; dark greenish gray (5G 4/1), fine to medium grained, none to very weakly foliated, moderately altered, foliated large veins of quartz and calcite appear to be brecciated and may be offset by thin healed shears joints or fractures; pegmatitic texture.		367
227									366
228									365
229									364
230	51	3.2/3.2	83	SW to F	R4				363
231									362
232									361
233		1.8							
234									
235									
236									
237									
238									
239									
240									

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1004A

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
240	52	1.8	79	SW to F	R4				360
241									359
242	53	2.0/2.0	95	SW to F	R4				358
243							META-QUARTZ DIORITE to META-GRANODIORITE; dark bluish gray (5PB 4/1), fine to medium grained, massive to very weakly foliated, upper 0.5 ft to 1.0 ft of core has a moderate mylonitic texture to it with some brecciation. Pegmatitic textures		357
244	54	3.2/3.2	100	SW to F	R4				356
245									
246									355
247									354
248	55	4.8/5.0	96	F	R4				353
249									352
250									
251									351
252							META-QUARTZ DIORITE to META-GRANODIORITE; dark bluish gray (10B Y/1), few flow structures and some small mafic xenoliths.	End day 4/27/06 Start of day 4/28/06; water level at 14 ft along inclined length of hole	350
253	56	5.0/5.0	100	F	R4				349
254									
255									348
256									347
257							META-QUARTZ DIORITE; dark bluish gray (10B 4/1 to 5PB 4/1), fine to medium grained, massive to weakly foliated. Highly sheared zone between 256.5 to 257.2 ft which exhibits both a mylonitic texture (along meta diorite veins) and a pegmatitic texture (within interior meta quartz diorite band)		346
258	57	5.0/5.0	100	F	R4				345
259									344
260									343
261									
262									342
263	58	5.0/5.0	95	F	R4				341
264								100% water loss to formation	340
265									
266									339
267							SAA; some thin healed fractures, some mafic xenoliths.		338
268									337
269	59	5.0/5.0	91	SW to F	R4				336
270							META-DIORITE vein/dike, fine grained foliated, plagioclase phenocrysts		335
271									
272	60	3.0/3.0	100	SW to F	R4		META-QUARTZ DIORITE; dark bluish gray (5PB 4/1),shear zone between 271 to 271.8 ft exhibits moderate brecciation healed with some altered plagioclase (pink), pyrite, and quartz, calcite, plagioclase vein. Pegmatitic texture		334
273									333
274									332
275	61	2.0/2.0	91	F	R4				331
276									330
277									
278									329
279	62	5.0/5.0	100	F	R4			100% water loss	328
280									327

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ROCK LOG - Boring No. B-1004A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
280										
281								SAA		326
282										325
283		63	3.7/3.7	88	F	R4				324
284									Boring terminated on 4/28/06 at 284.7 ft	323
285										322
286										321
287								Total Depth 284.7 ft.		320
288								Groundwater encountered at 14 feet		319
289								Borehole Grouted On 5/10/06		318
290										317
291										316
292										315
293										314
294										313
295										312
296										311
297										310
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320										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1005**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165715 E 1846277		Total Depth 50 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 562.2 feet MSL	Ground Water Depth 16.5 feet	Depth to Bedrock 8.2 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 4	Date Started 4/2/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/2/06

Reviewed by / Date F. Syms 5/27/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–8	1	2.3/2.5					CONCRETE removed using 6 inch thin wall bit, no rebar, smooth break at 3.1 ft. NQ core began at 4.3 ft.	Start core drilling 4/2/06	562–554
	2	1.6/1.8	100						
	1	4.8							
8–9				SW	R4 to R5		META-GRANODIORITE, bluish gray (10B 6/1), medium grain, equigranular, very closely spaced totally healed fractures CONTINUOUS ROCK	RQD applies to rock only	554–553
9–12	2	4.7/5.0	80	SW	R4 to R5				553–550
12–18							META-QUARTZ DIORITE, bluish gray (10B 5/1), medium grain, equigranular		550–544
12–18	3	5.0/5.0	96	F	R4 to R5				550–544
18–24							META-GRANODIORITE to META-QUARTZ DIORITE, bluish gray (10B 5/1), medium grain, equigranular		544–538
18–24	4	5.0/5.0	98	F	R4 to R5				544–538
24–29	5	4.9/5.0	48	SW	R4 to R5				538–533
28–29							Meta-diorite dike? upper contact highly irregular, lower contact at 45°		535–534
29–34							META-GRANODIORITE to META-QUARTZ DIORITE, bluish gray (10B 5/1), medium grained, equigranular		533–528
29–34	6	5.0/5.0	81	F	R4 to R5				533–528
34–40							SAA		528–523
34–40	7	5.0/5.0	80	F	R4 to R5				528–523

Project Name and Job Number
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ROCK LOG - Boring No. B-1005

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–50		8	5.0/5.0	89	F	R4 to R5		SAA, but lighter color (10B 6/1)		522–518
		9	5.7/6.0	74	F	R4 to R5		SAA; bluish gray (10B 5/1)		517–514
					SW	R4 to R5			Coring terminated on 4/2/06	513
50–80								Total Depth 50 ft. Groundwater encountered at 16.5 feet Borehole Grouted On 4/3/06		512–483

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1006**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165456 E 1846165		Total Depth 30 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 589.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock 2 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 1	Date Started 4/3/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/4/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–1							Unsampled gravel fill	Begin drilling on 4/3/06	589–588
2–3	1	1.0 / 1.0	45	F	R4 to R5		META-QUARTZ DIORITE		587–586
3–8	2	2.9 / 5.0	0	MW	R4 to R5				585–582
8–13	3	0.8 / 5.0	8	MW	R4 to R5				581–577
13–18	4	2.5 / 5.0	12	MW HW CW	R4 to R5 R0 to R1 R0		META-GRANODIORITE, bluish gray (10B 6/1), medium grained, equigranular, but highly weathered and pitted, strong oxidation.		576–571
18–23	5	0.0 / 5.0	0	CW	R0				570–567
23–28	6	0.2 / 5.0	0	CW	R0				566–562
28–30							No core recovered	End 4/3/06 Begin 4/4/06 Lost core barrel, hole abandon at 30 ft Moved to B-1006A	561–559
30–40									558–550

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1006A**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165453 E 1846160		Total Depth 90 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 589.6 feet MSL	Ground Water Depth 25 feet	Depth to Bedrock 14 feet
Casing Size and Depth 3.5 inch / 14 feet	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 3	Date Started 4/10/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/17/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–13								No Sampling	Start 4/11/06 0 to 14 ft - Drilled with NW casing without sampling	589–576
14–17		1	1.4/5.0	0	SW	R4 to R5		META-QUARTZ DIORITE, light gray (N 7), microcrystalline, thick quartz vein? massive body of quartz.	Begin NQ rock coring	575–573
17–18					HW	R0 to R1		META-GRANODIORITE, originally bluish gray (10B 6/1), medium gray, equigranular, pitted with heavy oxidation.		572–571
19–22		2	0.3/5.0	0	HW	R0 to R1				570–567
23–27		3	0.0/5.0	0	CW	R0				566–563
28								META-DIORITE medium to fine grain, equigranular, weathered salt and pepper appearance with >50% dark minerals, quartz veins up to 0.2 inches wide.		562
29–33		4	0.9/5.0	0	HW	R0 to R1				561–557
34–35		5	3.6/5.0	7	MW	R2				556–555
36–39					MW	R3		META-GRANODIORITE, originally bluish gray (10B 6/1), medium grained, equigranular		554–551
40										550

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1006A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
6	4.0/5.0	0	MW	R3		SAA	
7	3.5/5.0	10	HW to MW	R3			
			MW to SW	R3 to R4			
8	4.1/5.0	20	SW	R3 to R4		META-DIORITE, salt and pepper appearance (aprox. 10B 4/1), medium grain, equigranular, minor pooly developed foliation, >50% dark minerals.	
9	3.6/5.0	16					
10	5.0/5.0	90	F	R4 to R5		SAA, CONTINUOUS ROCK Meta-granodiorite xenolith 63.2 to 63.7 ft	
11	4.8/5.0	83	F	R4 to R5		META-GRANODIORITE; light bluish gray (10B 7/1); medium to coarse grained; equigranular	
12	5.0/5.0	80					
13	5.9/6.0	70	F	R4 to R5			End of 4/11/06 Begin day 4/12/06, water level at 25 ft

Depth (feet): 40–80
Elevation (feet): 549–510

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1006A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
80									End day 4/12/06 Begin day 4/14/06	509
81										508
82		14	5.0/5.0	100	F	R4 to R5				507
83										506
84										505
85										504
86										503
87		15	5.0/5.0	80	F	R4 to R5				502
88										501
89										500
90								META-GRANODIORITE, light bluish gray (5PB 8/1), medium grain.	Coring terminated on 4/14/06	499
91										498
92										497
93								Total Depth 90 ft. Groundwater encountered at 25 feet Borehole Grouted On 4/15/06		496
94										495
95										494
96										493
97										492
98										491
99										490
100										489
101										488
102										487
103										486
104										485
105										484
106										483
107										482
108										481
109										480
110										479
111										478
112										477
113										476
114										475
115										474
116										473
117										472
118										471
119										470
120										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1007**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165712 E 1846489		Total Depth 51.25 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 563 feet MSL	Ground Water Depth 7 feet	Depth to Bedrock 5.75 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 3	Date Started 3/28/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–4	1 2	2.3/2.5 1.8/1.8					CONCRETE removed using 6 inch thin wall bit. #6 rebar layer at 8 inches and 43 inches below top.	Concrete pre cored with thin wall bit to 4.25 ft 4 inch diameter steel pipe from 14 to 18 inch	563–559
4–6							CONCRETE	Begin core on 3/28/06	559–557
6–9	1	5.0/5.0	82	SW to F	R4 to R5		META-GRANODIORITE, blue gray (N 6), medium grain, equigranular, weak foliation can be seen by mafic minerals orientation, healed fractures closely spaced subparallel to foliation, biotite, quartz, K-spar, plagioclase, few quartz veins. CONTINUOUS ROCK	Losing water circulation at surface	557–554
9–14	2	4.9/5.0	70	SW to F F	R4 to R5		1/4 to 1/2 inch quartz vein		554–549
14–19	3	5.0/5.0	86	F	R4 to R5		META-GRANODIORITE gneissic foliation grades to more distinct foliation META-DIORITE, dark gray (N 4), fine grained, equigranular, contact shows slight gneissic bonding; calcite veins to 2 mm closely spaced 16 to 17 ft.		549–544
19–24	4	5.0/5.0	100	F	R4 to R5		Separation into mineral bands at contact increase in grain size, contact recrystallization?		544–539
24–29	5	4.7/5.0	58	F	R4 to R5		META-GRANODIORITE, gray (N 6), equigranular, medium grain, numerous calcite veins and quartz		539–534
29–34	6	5.0/5.0	77	F	R4 to R5				534–529
34–40	7	4.9/5.0	91	F	R4 to R5		META-DIORITE, dark gray (N 4), equigranular, fine grained lace with quartz vein, some containing chalcopyrite, foliated	End of 3/28/06	529–523

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1007

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40									Begin day 3/29/06	523
41										522
42		8	4.7/5.0	88	F	R4 to R5				521
43										520
44								META-GRANODIORITE, gray (N 6) equigranular, medium grain		519
45										518
46										517
47		9	5.0/5.0	100	F	R4 to R5				516
48								META-DIORITE, foliated, dark gray (N 4) equigranular, fine grained.		515
49										514
50		10	1.9/2.0	95	F	R4 to R5				513
51								META-GRANODIORITE xenolith, irregular		512
52									Coring terminated on 3/29/06 Water level at 7 ft	511
53										510
54								Total Depth 51.25 ft.		509
55								Groundwater encountered at 7 feet		508
56								Borehole Grouted On 3/29/06		507
57										506
58										505
59										504
60										503
61										502
62										501
63										500
64										499
65										498
66										497
67										496
68										495
69										494
70										493
71										492
72										491
73										490
74										489
75										488
76										487
77										486
78										485
79										484
80										483

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1008**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165623 E 1846335		Total Depth 51 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 563.2 feet MSL	Ground Water Depth 15 feet	Depth to Bedrock 6.6 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 3	Date Started 3/30/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 3/31/06

Reviewed by / Date F. Syms 5/27/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	2.4/2.5					CONCRETE removed using 6 inch thin wall bit. Several #3 rebars from 5.75 to 7.5 inch below the top. Several #5 rebars from 40 to 41 inch, #8 rebar at 3 inch	Concrete removed by thin wall bit to 4.25 ft
2	1.8/1.8						
						CONCRETE	Begin core 3/30/06
1	3.4/5.8	91	MW	R2		META-DIORITE, pyrite-rich, schistose fabric. CONTINUOUS ROCK	RQD applies to rock only
			F	R4 to R5		META-GRANODIORITE, light gray (N 7), medium to coarse grain.	
2	5.0/5.0	99	F	R4 to R5			
						META-GRANODIORITE, gray (N 6)	
3	5.0/5.0	55	F	R4 to R5			
						Pervasive calcite infilling along joints	
4	5.0/5.0	66	F	R4 to R5			
5	5.0/5.0	85	F	R4 to R5			
						META-GRANODIORITE, gray (N 6), medium to coarse grain with some darker (more mafic) xenoliths.	
6	5.0/5.0	80	F	R4 to R5			
7	4.7/5.0	82	F	R4 to R5			

Depth (feet): 0–40. Elevation (feet): 563–524.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1008

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
8	4.9/5.0	94	F	R4 to R5		Pervasive calcite veins	
9	6.0/6.0	93	F	R4 to R5		META-GRANODIORITE, quartz vein and thin calcite veins	
						META-QUARTZ DIORITE to META-DIORITE, bluish gray (5B 5/1), medium grained	
						META-GRANODIORITE, gray (N 6)	
						META-QUARTZ DIORITE to META-DIORITE, bluish gray (5B 5/1), medium grained	
						META-GRANODIORITE, gray (N 6), medium to coarse grained, some calcite veins.	End day 3/30/06 Begin 3/31/06; water level at 15 ft Coring terminated on 3/31/06

Total Depth 51 ft.
Groundwater encountered at 15 feet
Borehole Grouted On 3/31/06

Depth (feet): 40–80
Elevation (feet): 523–484

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1009**	
Type and Diameter of Boring Concrete core / 6 inch	Boring Location Unit 1 adjacent N 1165530 E 1846393		Total Depth 2.5 feet
Drilling Contractor and Rig Thin wall bit / Concrete core	Elevation and Datum 563 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Casing Size and Depth none	Length of Core Barrel and Bit 2.5 feet / 2.5 feet	No. of Core Boxes 1	Date Started 3/13/06
	Borehole Inclination -90	Logged by B. Reinicker	Date Completed 3/13/06

Reviewed by / Date C. Sams 4/7/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–2		1	1.3/2.5					CONCRETE removed using 6 inch thin wall bit by coring sub-contractor, approximately 7/8 inch diameter rebar at 7 inch to 7-7/8 inch. Encountered pipe at 13 1/4 inch. Bottom of retrieval core at 16 1/4 inch.	Start 3/13/06 Water loss at 1 ft Core not recoverable below 16 inch due to pipe	563–561
3									End boring 3/13/06, core not continued due to pipe, see B-1009A	560
4–40										559–523

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1009A**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent turbine room N 1165529 E 1846392		Total Depth 51 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 562.9 feet MSL	Ground Water Depth 0 feet	Depth to Bedrock 20.2 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 3	Date Started 3/31/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/1/06

Reviewed by / Date F. Syms 5/27/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–5							CONCRETE removed using 6 inch thin wall bit. Light gray, approximately 1 inch diameter rebar at 8 to 9 inches encountered pipe from 14 to 17 3/4 inches. Approximately 1 inch diameter rebar at 40.5 to 41.5 inches CONCRETE, dark gray color change at 46.75 inches CORING TERMINATED at 5.0 ft.	Concrete removed by thin wall to 5 ft; location 19 inch from B-1009	562–558
5–7.5	1	5.0/5.0					CONCRETE	Begin coring 3/31/06	558–554
7.5–10	2	5.0/5.0							554–551
10–15	3	5.0/5.0							551–543
15–20	4	4.6/5.0	77	F	R4 to R5		META-GRANODIORITE, gray (N 6), medium coarse grain, some calcite veins CONTINUOUS ROCK	End 3/31/06 Begin 4/1/06; water level at 0 ft due to nearby pumping operation	543–538
20–25	5	4.7/5.0	83	F	R4 to R5				538–533
25–30	6	4.4/5.0	72	SW	R4 to R5		META-QUARTZ DIORITE for 0.2 ft, no definite contact, slightly more mafic, possible xenolith		533–528
30–40	7	4.4/5.0	81	SW to F	R4 to R5		META-GRANODIORITE to META-QUARTZ DIORITE, gray to bluish gray (N 6 to 10B 5/1 to 10B 6/1), medium grain, At about 35 ft. begin to see color variation, gray grading into darker bluish gray, changes occur over intervals of 0.5 to 1 ft. More prominent calcite veining, veins up to 0.1 inch		528–523

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1009A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–45		8	5.0/5.0	71	F	R4 to R5				522–518
45–51		9	5.5/6.0	82	F	R4 to R5				517–512
51–80								Total Depth 51 ft. Groundwater encountered at 0 feet Borehole Grouted On 4/1/06	Coring terminated 4/1/06; water at 16 ft	511–483

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389			**ROCK LOG - Boring No. B-1010**
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 1 adjacent N 1165551 E 1846525		Total Depth 51 feet
Drilling Contractor and Rig MACTEC/Burnett/219907 / CME 75	Elevation and Datum 563.1 feet MSL	Ground Water Depth 7 feet	Depth to Bedrock 6.2 feet
Casing Size and Depth none	Length of Core Barrel and Bit 10 feet / 10 feet	No. of Core Boxes 3	Date Started 3/29/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	2.0/2.5					CONCRETE removed using 6 inch thin wall bit. 7/8 inch diameter rebar at 8 1/4 inches CONCRETE 7/8 to 1 inch diameter rebar at 43 1/2 to 45 inches.	Concrete removed by 6 inch thin wall bit to 4.25 ft
2	1.8/1.8						
						CONCRETE	Begin drilling 3/29/06
1	5.1/5.1	71	F	R4 to R5		META-GRANODIORITE to META-QUARTZ DIORITE, gray (N 5) fine to medium grained, pervasive calcite veins up to 0.5 inch thick along foliation, weak foliation CONTINUOUS ROCK	
2	5.7/5.7	89	F	R4 to R5		Mostly fine grain	
3	4.6/5.0	86	F	R4 to R5		META-DIORITE dark gray (N 5), fine grain, pervasive calcite veins.	
						Gradational Zone; migmatite texture	
4	5.0/5.0	68	F	R4 to R5		META-GRANODIORITE, gray (N 6), medium to coarse grain	
5	4.9/5.0	86	F	R4 to R5			
6	5.0/5.0	96	F	R4 to R5		META-QUARTZ DIORITE, dark gray (N 5), medium grain, with pervasive calcite veins	
7	4.5/5.0	87	F	R4 to R5			

Depth (feet): 0–40. Elevation (feet): 563–524.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1010

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40										523
41										522
42		8	4.9/5.0	94	F	R4 to R5		METAGRANODIORITE, gray (N 5), medium to coarse grain.		521
43										520
44										519
45										518
46										517
47		9	5.5/5.0	92	F	R4 to R5				516
48										515
49										514
50										513
51									Coring terminated on 3/29/06; water at 7 ft	512
52										511
53										510
54								Total Depth 51 ft. Groundwater encountered at 7 feet Borehole Grouted On 3/29/06		509
55										508
56										507
57										506
58										505
59										504
60										503
61										502
62										501
63										500
64										499
65										498
66										497
67										496
68										495
69										494
70										493
71										492
72										491
73										490
74										489
75										488
76										487
77										486
78										485
79										484
80										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1011**	
Type and Diameter of Boring HQ core / 3.5 inch	Boring Location Unit 1 adjacent N 1165997 E 1846673		Total Depth 220 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 537.7 feet MSL	Ground Water Depth 4 feet	Depth to Bedrock 0 feet
Casing Size and Depth none	Length of Core Barrel and Bit 7 feet / 13 feet	No. of Core Boxes 16	Date Started 3/20/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–3		1	2.5/3.0	81	SW to F	R3		META-DIORITE, greenish gray, very fine grained, massive. CONTINUOUS ROCK	Begin 3/20/06	537–535
3–7		2	3.9/4.0	80	SW to F	R3		META-GRANODIORITE to META-QUARTZ DIORITE		535–531
7–8		3	1.0/1.0	0	SW to F	R3		META-DIORITE 7.5 to 8 ft		531–530
8–13		4	4.9/5.0	98	SW to F	R3		META-QUARTZ DIORITE to META-GRANODIORITE, fine to medium grained, massive		530–525
13–18		5	4.3/5.0	86	SW to F	R3 to R4		META-GRANODIORITE to META-QUARTZ DIORITE; quartz, plagioclase, and biotite gneiss metagranitoid		525–520
18–23		6	5.0/5.0	82	SW to F	R3 to R4		META-QUARTZ DIORITE, medium to coarse grained, moderately spaced fractures (foliation joints), mafic xenoliths up to 1 inch are present but not prevalent, quartz, plagioclase, biotite gneiss		520–515
23–28		7	4.5/5.0	71	SW to F	R3 to R4		SAA, medium to fine grained, quartz and feldspar veins are randomly oriented.		515–510
28–33		8	4.9/5.0	85	SW to F	R3 to R4		SAA; quartz, plagioclase gneiss, minor K-spar (as veins) calcite associated with incipient fractures; large pegmatite quartz vein cut half the diameter and half the length of the core between 28 and 30.3 ft	Losing ~50% of water Hard, slow drilling.	510–505
33–36		9	3.5/3.5	97	SW to F	R3 R4 to R5		SAA, fine to medium grained, quartz, plagioclase gneiss; fractures appear to have manganese oxide and possible slickenside development Quartz pegmatite vein from 35 to 38.65 ft		505–502
36–37		10	1.5/1.5	100	SW to F	R4 to R5				502–501
37–40		11	2.8	94	SW to F	R4 to R5				501–498

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1011

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
	3.0					Quartz pegmatite vein from 40.2 to 40.6 ft	
12	1.9/2.0	95	SW to F	R4 to R5		SAA, slightly coarser grained than samples above, quartz, plagioclase gneiss	
13	3.6/3.6	92	SW to F	R3 to R4		SAA, massive, predominately equigranular, quartz, plagioclase, biotite gneiss.	
14	1.3/1.4	93	SW to F	R3 to R4			Start of day 3/22/06; water level at 5.4 ft
15	5.0/5.0	78	SW to F	R3 to R4			
16	5.0/5.0	89	SW to F	R4 to R5		META-QUARTZ DIORITE to META-GRANODIORITE, bluish gray, medium to fine grained, massive, primarily equigranular, quartz, plagioclase, biotite gneiss, metagranitoid	
17	4.9/5.0	96	SW to F	R4 to R5		META-QUARTZ DIORITE, bluish gray, quartz, plagioclase, biotite gneiss, some mafic xenoliths up to 1.5 inch wide, many healed joints with calcite.	
18	5.0/5.0	100	SW to F	R4 to R5		SAA, massive, equigranular, numerous randomly oriented healed joints, unhealed joint surfaces are partially mineralized with probable chlorite; metagranitoid.	
19	4.8/5.0	96	SW to F	R4 to R5			
20	5.0/5.0	100	SW to F	R4 to R5		SAA, medium to coarse grained, massive to weakly foliated, calcite mineralization along incipient fractures and along joint surfaces, some randomly oriented mafic xenoliths.	End of day 3/22/06 Start day 3/27/06 water level at 3 ft
	3.9						

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1011

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
21	4.0	98	SW to F	R4 to R5			
22	0.9 / 1.0	66	SW to F	R4 to R5			
23	4.9 / 5.0	84	SW to F	R4 to R5		SAA; calcite mineralization along healed fractures and joint surfaces some mafic xenoliths.	
24	5.0 / 5.0	100	F	R4 to R5		SAA; bluish gray; medium to coarse grained; massive; some to many mafic xenoliths; plagioclase, quartz, biotite gneiss	
25	5.0 / 5.0	100	F	R4 to R5			
26	4.8 / 5.0	96	SW to F	R4 to R5		META-QUARTZ DIORITE to META-GRANODIORITE; bluish gray; medium to coarse grained; massive; calcite mineralization and minor K-spar mineralization along healed fractures and joint surfaces; some mafic xenoliths; plagioclase, quartz, biotite gneiss	
27	4.3 / 5.0	80	SW to F	R3 to R4		META-QUARTZ DIORITE; bluish gray; medium to coarse grained; massive; calcite and minor K-spar mineralization along healed fractures and joint surfaces; mafic xenoliths randomly oriented; quartz, plagioclase, biotite gneiss	
28	4.8 / 5.0	84	SW to F	R3 to R4		SAA; fine to medium grained; sample dominated by plagioclase and quartz with rich K-spar zones; some mafic xenoliths present	End of day 3/27/06 Start of day 3/28/06, water measured at 4 ft
29	4.9 / 5.0	94	SW to F	R3 to R4			
30	3.4	75	SW to F	R3 to R4		META-QUARTZ DIORITE, fine to medium grained, massive, unit dominated by quartz and feldspar (plagioclase), also some biotite (~15%), some mafic	

Depth (feet): 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120

Elevation (feet): 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447, 446, 445, 444, 443, 442, 441, 440, 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419, 418

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1011

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
120–121		3.4					xenoliths.		417
122	31	1.5/1.6	90	SW to F	R3 to R4				416
123–127	32	4.9/5.0	98	SW to F	R3; R4 to R5		META-QUARTZ DIORITE to META-GRANODIORITE, fine to medium grained, massive, dominated by plagioclase, quartz, and biotite, some mafic xenoliths		415–410
128–132	33	5.0/5.0	97	F	R4 to R5		SAA		409–405
133	34	1.0/1.0	85	SW to F	R4 to R5				404
134–138	35	3.9/4.0	98	SW to F; SW to F	R4 to R5; R4 to R5		META-GRANODIORITE to META-QUARTZ DIORITE, fine to medium grained, massive, plagioclase, quartz, and biotite are dominant minerals, some K-spar is also present, some randomly oriented mafic xenoliths also present.	Hard, slow drilling	403–400
139–143	36	5.0/5.0	96	SW to F	R4 to R5				399–395
144–148	37	5.0/5.0	94	SW to F	R4 to R5		META-QUARTZ DIORITE; bluish gray; fine to medium grained; massive; dominated by plagioclase, quartz, and biotite; some mafic xenoliths are found randomly oriented within sample		394–390
149–153	38	5.0/5.0	90	SW to F	R4 to R5		META-GRANODIORITE to META-QUARTZ DIORITE, fine to medium grained, massive, plagioclase, quartz, and biotite are the main major minerals, some randomly oriented mafic xenoliths present		389–385
154–158	39	5.0/5.0	94	SW to F	R4 to R5		META-GRANODIORITE to META-QUARTZ DIORITE, massive, fine to medium grained, biotite is accessory mineral to plagioclase and quartz	End of day 3/28/06 Start 3/29/06 water level at 4 ft	384–380
159–160							SAA, fine to coarse grained, quartz and feldspar (plagioclase and some K-spar); biotite is dominant accessory mineral; some mafic xenoliths present show		379–378

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1011

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
40	4.9/5.0	89	SW to F	R3 to R5		probable elongation	
41	5.0/5.0	85	SW to F	R4 to R5			
42	5.0/5.0	94	SW to F	R3 to R5		SAA, bluish gray, plagioclase and quartz are dominant minerals, K-spar, biotite and some chlorite are accessory minerals, some mafic xenoliths.	
43	4.9/5.0	98	SW to F	R4 to R5			
44	5.0/5.0	93	SW to F	R4 to R5		META-QUARTZ DIORITE to META-GRANODIORITE, massive, fine to medium grained, some shear zones and brecciated areas are present, biotite and K-spar are the primary accessory minerals	
45	4.9/5.0	92	SW to F	R3 to R5			
46	5.0/5.0	98	SW to F	R3 to R4		SAA, bluish gray to pinkish gray, massive, fine to coarse grained, plagioclase alteration (translucent pink crystals) appears to be occurring along zones with high amounts of fractures both healed and open, probable foliation associated with joints.	
47	4.8/5.0	96	SW to F	R4 to R5		SAA, some mafic xenoliths are present, weak to very weak foliation probable along joints.	

Depth (feet): 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200

Elevation (feet): 377, 376, 375, 374, 373, 372, 371, 370, 369, 368, 367, 366, 365, 364, 363, 362, 361, 360, 359, 358, 357, 356, 355, 354, 353, 352, 351, 350, 349, 348, 347, 346, 345, 344, 343, 342, 341, 340, 339, 338

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1011

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
200–203		48	5.0/5.0	91	SW to F	R3 to R5		SAA; bluish gray; fine to medium grained; quartz, plagioclase, biotite, and possible K-spar		337–335
203–208		49	5.0/5.0	100	SW to F	R4 to R5				334–330
208–213		50	4.8/5.0	64	SW to F	R3 to R4				329–325
213–220		51	7.0/7.0	100	SW to F	R3 to R4			Losing some water ~25%	324–318
220–240								Total Depth 220 ft. Groundwater encountered at 4 feet Borehole Grouted On 4/26/06	Coring terminated on 3/29/06	317–298

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1012**	
Type and Diameter of Boring HQ core / 3.5 inch	Boring Location Unit 2 N 1166228 E 1847098		Total Depth 150.2 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 566.2 feet MSL	Ground Water Depth 7.2 feet	Depth to Bedrock 1 feet
Casing Size and Depth none	Length of Core Barrel and Bit 5 feet / 10 feet	No. of Core Boxes 12	Date Started 4/27/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/30/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
						Drilled without sampling using roller bit	0 to 1 ft drilled with roller bit Start 4/27/06
1	4.5/5.0	32	SW	R3 to R4		META-GRANODIORITE, light bluish gray (10B 7.5/1), medium to coarse grain, equigranular.	RQD artifically low due to CNS blasting and excavation methods/mechanically disturbed End day 4/27/06 Begin day 4/28/06
2	5.0/5.0	76	SW MW to HW SW to F	R4 R1 R4		SAA, CONTINUOUS ROCK	
3	5.0/5.0	100	SW to F	R4 to R5		SAA, light bluish gray (5B 7/1), medium grained	
4	4.9/5.0	88	F	R5			
5	5.0/5.0	100	F	R5			
6	5.0/5.0	100	F	R5			
7	5.0/5.0	100	F	R5		SAA, (10B 6.5/1)	
8	5.0/5.0	100	F	R5			

Depth (feet): 0–40. Elevation (feet): 566–527.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1012

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	5.0/5.0	100	F	R5		SAA, light bluish gray (10B 7/1)	
10	5.0/5.0	100	F	R5			
11	5.0/5.0	100	F	R5			
12	5.0/5.0	100	F	R5			End day 4/28/06. Begin day 4/29/06 water level at 7.2 ft.
			F	R5		META-DIORITE zone, bluish gray (5B 5.5/1), medium to fine grained 58.7 to 61 ft	
13	5.0/5.0	100	F	R5		META-GRANODIORITE, light bluish gray (5PB 7/1), coarse grained	
14	5.0/5.0	98	F	R5			
15	5.0/5.0	98	F	R5		SAA, light bluish gray (5PB 7/1), coarse grain, equigranular Brecciated (healed), sub-vertical, incipient fracture filled with calcite, vein thin, widely spaced	
16	5.0/5.0	100	F	R5		SAA, with plagioclase along and near healed joints.	

Depth (feet): 40–80. Elevation (feet): 526–487.

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1012

Run No.	Recovery / Cut	% RQD	Weathering	Strength	Lithology	Remarks
17	5.0/5.0	98	F	R5		
18	5.0/5.0	97	F	R5		
19	5.0/5.0	97	SW to F	R4		
20	5.0/5.0	96	F	R4		
21	4.9/5.0	98	F	R4	META-GRANODIORITE, dark bluish gray (5B 4/1), medium to coarse grain porphyritic weak foliation	
22	4.7/5.0	94	F	R4	SAA, bluish black (10B 2.5/1), but more mafic, healed shear zones and fractures filled with fine grained meta-diorite	
23	5.0/5.0	100	F	R4	SAA, more pink coloration to feldspar near shear zones, weak foliation 40º	
24	5.0/5.0	96	F	R4		

Depth (feet): 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120

Elevation (feet): 486, 485, 484, 483, 482, 481, 480, 479, 478, 477, 476, 475, 474, 473, 472, 471, 470, 469, 468, 467, 466, 465, 464, 463, 462, 461, 460, 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1012

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
25	5.0/5.0	86	F	R4		SAA, dark bluish gray (5B 4/1), medium to large grained, felsic grains are generally larger than mafic grains, some zones of healed shears and brecciation quartz grains blue, pyrite crystals, plagioclase	
26	5.0/5.0	100	SW to F	R4			
27	5.0/5.0	100	F	R5		META-DIORITE, dark greenish gray (5GY 4/1) strong foliation dipping 70 to 80° grain sizes aphanitic to medium size. SAA, (5GY 4/1)	
28	5.0/5.0	100	F	R5		META-DIORITE bluish gray (10PB 6/1), medium grain, strong foliation widely spaced veins with calcite.	
29	5.0/5.0	100	F	R5			
30	4.2/4.2	98	F	R5		META-GRANODIORITE, light bluish gray (5B 7/1) and bluish gray (5B 5/1), medium grained strong, foliation. META-DIORITE, dark greenish gray (5GY 4/1) medium grained.	
						Total Depth 150.2 ft. Groundwater encountered at 7.2 feet Borehole Grouted On 1/19/07	Coring terminated on 4/30/06

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1013**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 2 N 1166266 E 1847167		Total Depth 52 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 558.7 feet MSL	Ground Water Depth 8.5 feet	Depth to Bedrock 0 feet
Casing Size and Depth none	Length of Core Barrel and Bit 8 feet / 13 feet	No. of Core Boxes 3	Date Started 5/10/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 5/11/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–3		1	3.4/3.5	97	SW	R3		META-GRANODIORITE, bluish gray (5PB 5/1), some chlorite associated with calcite along minor healed shear planes, massive, fine to medium grained CONTINUOUS ROCK	Begin day 5/10/06	558–556
3–8		2	4.5/5.0	100	SW	R3		META-GRANODIORITE to META-QUARTZ DIORITE, massive, fine to medium grained, some mafic xenoliths.		555–551
8–18		3	4.3/5.0	86	SW	R3 to R4		META-QUARTZ DIORITE, dark bluish gray (5B 4/1), massive, fine to medium grained, some mafic xenoliths	End of day 5/10/06 Start of day 5/11/06; at water to 8.5 ft	550–541
14–18		4	3.2/3.2	100	SW to F	R3 to R4				545–541
17–18		5	1.4/1.8	78	SW to F	R3 to R4				542–541
18–28		6	4.3/5.0	86	SW to F	R3 to R4		META-QUARTZ DIORITE to META-GRANODIORITE, dark bluish gray (5B 4/1); fine to medium grained; massive		540–531
24–28		7	5.0/5.0	99	SW to F	R3 to R4				535–531
28–29		8	1.5/1.5	100	SW to F	R4		META-QUARTZ DIORITE, dark bluish gray to bluish gray (5B 4/1 to 5PB 5/1), massive, fine to medium grained		530–529
29–33		9	2.7/3.0	90	SW to F	R4		META-QUARTZ DIORITE to META-GRANODIORITE, bluish gray (5PB 5/1), fine to medium grained, massive healed, quartz vein at 30.2 ft. minor offset along healed shear		528–526
33–38		10	5.3/5.5	96	SW to F	R4				525–521
38–40								META-DIORITE, greenish black (5G 2.5/1), very fine grained, massive to weakly foliated		521–519

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1013

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40										
41		11	4.2/5.0	84	SW to F	R3 to R4		META-QUARTZ DIORITE to META-GRANODIORITE, fine to medium grained, massive, healed zone of brecciation along quartz vein with altered plagioclase (pink) along margin of quartz vein		518
42										517
43										516
44								META-DIORITE, greenish gray (5G 2.5/1), fine grained, massive to weakly foliated	~30 to 50% water loss	515
45										514
46										513
47		12	7.0/7.0	100	SW to F	R3 to R4				512
48										511
49									~50% water loss	510
50									From 50.5 to 52 ft overdrilled to obtain core.	509
51									Drilling terminated	508
52										507
53									Coring terminated on 5/11/06	506
54										505
55								Total Depth 52 ft.		504
56								Groundwater encountered at 8.5 feet		503
57								Borehole Grouted On 4/11/06		502
58										501
59										500
60										499
61										498
62										497
63										496
64										495
65										494
66										493
67										492
68										491
69										490
70										489
71										488
72										487
73										486
74										485
75										484
76										483
77										482
78										481
79										480
80										479

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1014**	
Type and Diameter of Boring NQ / HQ core / 3.5 inch	Boring Location Unit 2 adjacent N 1166150 E 1847262		Total Depth 75.5 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 544.4 feet MSL	Ground Water Depth 0 feet	Depth to Bedrock 1 feet
Casing Size and Depth 4 inch / 3.4 feet	Length of Core Barrel and Bit 8.1 feet / 8.1 feet	No. of Core Boxes 7	Date Started 5/16/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/23/06

Reviewed by / Date B. Reinicker 5/31/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	4.1/5.0	100	MW to SW	R3		GRAVEL (GP), bluish gray (10B 5/1) fine to coarse, angular, Quartz diorite, diorite	Begin 5/16/06, Goodman jack tests performed in this boring
			MW	R3		META-QUARTZ DIORITE; bluish gray (10B 5/1); fine to medium grained; quartz, plagioclase, hornblende, trace pyrite mineralization, staining on joint surfaces, calcite CONTINUOUS ROCK	
			MW to SW	R3 to R4		META-DIORITE; black (2.5/N); bluish gray, fine grained; quartz, plagioclase, calcite veins, trace pyrite, hornblende; FILL	
2	4.5/5.0	90	MW to SW	R3 to R4	CKE-10 CKE-11 CKE-09	META-QUARTZ DIORITE bluish gray (10B 5/1); fine to medium grained; quartz, hornblende, plagioclase, calcite, muscovite, epidote mineralization on face, altered plagioclase	Goodman Jack Tests: 6.29 to 6.96 ft 7.29 to 7.96 ft 8.29 to 8.96 ft
						META-DIORITE; black (2.5/N); bluish gray; fine grained; hornblende, quartz, plagioclase, calcite, biotite; calcite rich veins	
3	5.0/5.0	100	MW to SW	R3 to R4		META-GRANODIORITE; bluish gray (10B 5/1); fine to medium grained; quartz, plagioclase, hornblende, calcite, muscovite, biotite	End of 5/16/06 Start 5/17/06; water measured at 0.0 ft - boring located in low area requiring pumping for rig access
					CKE-13		
4	3.0/3.0	100	SW	R4	CKE-12		Goodman Jack Tests: 14.89 to 15.56 ft 16.49 to 17.16 ft 24.89 to 25.56 ft Subject to inundation without pumping
5	2.0/2.0	100	SW	R4			
6	5.0/5.0	100	SW	R4			
			MW	R3	CKE-14		
7	3.0/3.0	87	SW to F	R4			
8	3.0/3.0	100	SW to F	R4		META-GRANODIORITE to META-QUARTZ DIORITE; bluish gray, gray, black; fine to medium grained; few healed fractured with mafic minerals; plagioclase, quartz, hornblende, biotite; mafic inclusion (2.5 cm x 4.5 cm)	End of 5/17/06 Start of 5/22/06; water measured 0 ft
9	5.3/5.3	100		R4		Quartz in filled fracture/dike; joint surfaces show evidence of manganese staining from 32 to 34.5 ft	
			F	R4			
10	5.0/5.0	100	F	R4		SAA; plagioclase, quartz, hornblende, micaceous minerals, K-spar, calcite healed vein on few incipient fractures Fine grained felsic bands (38 to 39.7 ft); ~2 to 3 cm wide	End of 5/22/06 Start of 5/23/06; water measured 0 ft

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1014

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–41									504–503
42–46	11	5.0/5.0	100	F	R4		Mafic inclusion (4 cm x 5 cm)		502–498
47–51	12	5.0/5.0	100		R4				497–493
52–56	13	5.0/5.0	100	F	R4		Quartz and calcite pegmatite (2 cm x 1 cm) Calcite quartz and epidote or hornblende pegmatite Meta-diorite dike from 54.5 to 55.6 ft		492–489
57–61	14	5.0/5.0	100	F	R4		SAA; subvertical calcite stringers throughout Meta-diorite dike from 59.5 to 59.8 ft		488–484
62–66	15	5.0/5.0	100	F	R4		META-GRANODIORITE AND META-QUARTZ DIORITE; bluish gray, gray, pinkish gray (5YR 7/2); black, fine to medium grained; calcite veins throughout. Mafic inclusion (10 cm x 8 cm) Quartz pegmatite (1 cm x 4.5 cm)		483–479
67–71	16	5.0/5.0	100	F	R4		Mafic inclusion (2 cm x 4 cm) Joint/fracture healed thick with quartz, K-spar, biotite, calcite, pyrite		478–474
72–75	17	4.0/4.2	95	F	R4			Coring terminated on 5/23/06	473–469
76–80							Total Depth 75.5 ft. Groundwater encountered at 0 feet Borehole Grouted On 4/3/07		468–465

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1015**	
Type and Diameter of Boring HQ core / 3.5 inch	Boring Location Unit 2 N 1166134 E 1847192		Total Depth 250.3 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 560.1 feet MSL	Ground Water Depth 4.5 feet	Depth to Bedrock 0 feet
Casing Size and Depth 4 inch / 2.5 feet	Length of Core Barrel and Bit 8.1 feet / 8.1 feet	No. of Core Boxes 21	Date Started 5/1/06
	Borehole Inclination -90	Logged by A. Tillery/J. Cerceo	Date Completed 5/13/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–5		1	4.9/5.0	62	MW to SW	R3		META-GRANODIORITE, dark bluish gray (5B 4/1) to bluish gray (5PB 5/1), medium grained, numerous healed joints. Quartz 15 to 20%, plagioclase 30 to 40%, mafics 30%, fine grained mafic xenoliths occasional and usually 1 to 5 cm rounded. Healed joint and foliation are often filled with calcite weak foliation	Begin 5/1/06 RQD artifically low due to historic CNS blasting and excavation methods (mechanically disturbed)	560–555
5–6		2	1.0/1.0	45	SW	R3				555–554
6–11		3	5.0/5.0	100	SW	R3 TO R4		SAA CONTINUOUS ROCK		554–549
11–16		4	5.0/5.0	84	SW to F	R4		Some large K-spar crystals		549–545
16–21		5	5.0/5.0	88	SW to F	R4		META-GRANODIORITE or META-QUARTZ DIORITE; dark bluish gray (10B 4/1), to light bluish gray (5PB 7/1), fine to medium grained, occasional mafic xenoliths, moderately spaced totally healed fractures, widely spaced vein and completely healed shear zones, quartz crystals		545–539
21–26		6	4.9/5.0	76	F	R4				539–534
26–31		7	4.9/5.0	86	F	R4				534–529
31–36		8	5.0/5.0	98	F	R4		SAA, light bluish gray (5PB 7/1) to dark bluish gray (5PB 3/1), medium grained; mafic xenoliths fine, small (1 cm), mafic rock xenoliths throughout healed shear zones and healed joints, joints moderately spaced throughout with weak to no foliation.		529–524
36–40		9	5.0/5.0	98	F	R4		SAA, slightly coarser grained, more pink feldspar		524–521

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1015

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
10	5.0/5.0	96	F	R4		SAA, dark bluish gray (5B 4/1) to light bluish gray (5PB 7/1), medium sized grains, foliation, healed fractures are often filled with calcite	End of day 5/1/06 Start day 5/2/06 water level 4.0 ft
11	5.0/5.0	90	F	R4 TO R5			
12	4.9/5.0	91	F	R4 TO R5		SAA, several (1 inch thick) sub vertical healed shears zones, iIncreased amounts of K-spar Strong mineral alignment 54.8 to 55.8 ft SAA continued strong foliation ~40° dip at 56 to 57 ft	
13	5.0/5.0	98	F	R5		SAA, dark bluish gray (5B 4/1) to light bluish gray (5PB 7/1) medium grained, blue quartz gray feldspar, some pink feldspar, calcite fills healed fractures, slight foliation, moderately spaced, healed fractures with zones of healed shearing and brecciation	
14	4.9/5.0	72	F	R5			
15	5.0/5.0	98	F	R4 TO R5			
16	4.9/5.0	98	F	R5			
17	5.0/5.0	99	F	R5		META-DIORITE, bluish gray (5PB 6/1) to bluish black (10B 2.5/1) META-GRANODIORITE or META-QUARTZ DIORITE, dry color: gray (6/N), pink bluish gray (10B 3/1), medium grained, occasional white quartz veins, crystalline quartz, plagioclase. Mafic minerals fine grained, foliation indicated by mineral alignment, intermittent.	

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1015

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
18	5.0/5.0	96	F	R5			
19	4.8/5.0	90	F	R5			End day 5/2/06 Begin 5/3/06
20	5.0/5.0	100	F	R5		SAA, bluish gray (5PB 6/1) to dark bluish gray (10B 4/1), medium grained, slight foliation evidenced by alignment of mineral grains.	
21	4.6/5.0	92	F	R5		SAA, some pegmatite feldspar and quartz veins widely spaced	
22	5.0/5.0	100	F	R5			
23	5.0/5.0	84	F	R5		META-GRANODIORITE, light bluish gray to bluish gray, black (2.5/N), red (10R 5/8), fine to medium grained, quartz, plagioclase, K-spar, calcite, epidote, hornblende. Brecciated granodiorite healed with epidote and altered plagioclase, calcite, K-spar, quartz.	End day 5/3/06 Start 5/9/2006 water measured 2.67 ft
24	5.0/5.0	98	F	R5			
25	4.9/5.0	98	F			META-QUARTZ DIORITE to META-GRANODIORITE, bluish gray to black, gray (7.5YR 6/1), fine to medium grained, gray mineralization and healed fractures; quartz, plagioclase, hornblende, K-spar, calcite, and altered plagioclase, mafic xenoliths	

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1015

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
120–121									440–439
122–123–124	26	4.0/4.0	100	F	R5		Healed brecciated zone (122 to 123.3 ft) from multiple fractures healed with mafic minerals. Subvertical fractures within the quartz vein		438–437–436
125	27	1.0/1.0	100						435
126–127–128–129–130	28	5.0/5.0	88	F	R5		Weak foliation from ~126.8 to 128.5 Weak foliation from partly healed incipient fractures.		434–433–432–431–430
131–132–133–134–135	29	5.0/5.0	94	F	R5				429–428–427–426–425
136–137–138–139–140	30	5.0/5.0	100	F	R5		Mafic xenolith Mafic xenolith Stress fractures healed with a gray mineral		424–423–422–421–420
141–142–143–144–145	31	5.0/5.0	96	F	R5		SAA, bluish gray, black, red; fine to medium grained; biotite, muscovite, quartz, K-spar, pyrite, epidote, calcite, hornblende. Mafic vein (142.8 to 143.3 ft)	End drilling 5/9/06 Start day 5/10/06 water at 3.0 ft	419–418–417–416–415
146–147–148–149–150	32	4.9/5.0	92	F	R5		Gray mineralization along stress fractures; pyrite, muscovite, or biotite mineralization quartz and K-spar pegmatite. META-GRANODIORITE bluish gray, black, light brown (10B 5.5/1, N 2.5, 7.5YR 6/4); fine to medium grained; quartz, plagioclase, hornblende, epidote, biotite, muscovite, pyrope (garnet) calcite and chlorite. Quartz pegmatite, pyrope (garnet) red mineralization.		414–413–412–411–410
151–152–153–154–155	33	5.0/5.0	100	F	R4		META-DIORITE, black and dark greenish gray (5G 4/1); fine grained; calcite and epidote healed most fractures; hornblende, plagioclase, biotite.		409–408–407–406–405
156–157–158–159–160	34	5.0/5.0	98	F	R4		META-GRANODIORITE; bluish gray, black, light brown,		404–403–402–401

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1015

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
						fine to medium grained, plagioclase, quartz, altered plagioclase, hornblende, biotite, epidote, and calcite mineralization.	
35	5.0/5.0	88	F	R4		Mafic xenolith	
36	5.0/5.0	100	F	R4		META-DIORITE; very dark bluish gray (5PB 3/1); fine grained; quartz pegmatite, hornblende, plagioclase, quartz, biotite, calcite, epidote, muscovite.	
			SW	R3			
37	5.0/5.0	91	F	R4		META-GRANODIORITE to META-QUARTZ DIORITE; bluish gray to light brown; fine to medium grained, hornblende, plagioclase, quartz, calcite	
38	5.0/5.0	90	F	R4			
				R5			
39	5.0/5.0	100	F	R5		Mafic inclusion	
40	5.0/5.0	100	F	R5		SAA; healed fractures Mafic inclusion Mafic inclusion Mafic inclusion Mafic inclusion (6 cm)	
41	5.0/5.0	100	F	R5		META-QUARTZ DIORITE to META-GRANODIORITE; bluish gray, black, gray (7.5YR 6/1), fine to medium grained, plagioclase, hornblende, quartz, epidote Mafic inclusion (4 cm) Mafic inclusion (4 cm)	End drilling 5/10/06 Start drilling 5/11/06, water measured 4.5 ft.
42	5.0/5.0	100	F	R5		META-QUARTZ DIORITE; bluish gray, black gray (7.5YR 6/1); fine grained; plagioclase, hornblende, quartz, K-spar, mafic mineralization occurred along healed fractures.	

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1015

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
200							Mafic inclusion (3 cm)		360
201									359
202	43	5.0/5.0	100	F	R5		Quartz pegmatite Mafic inclusion (4 cm); fine grained mineralization of pyrite, biotite and muscovite (202 to 202.3 ft)		358
203									357
204									356
205									355
206	44	5.0/5.0	100	F	R5				354
207									353
208									352
209									351
210									350
211	45	5.0/5.0	100	F	R5		META-QUARTZ DIORITE; bluish gray, black, gray (7.5YR 6/1); fine to medium grained; mafic mineralization healed in incipient fractures; mafic inclusion (5 cm); quartz, plagioclase, hornblende, calcite, biotite, muscovite.		349
212									348
213									347
214									346
215							Calcite is mostly equigranular (~2 mm), rhombohedral, white, and pale red to pink (10R 7/3 to 10R 8/3)		345
216	46	1.7/1.7	100	F	R5				344
217							Mafic inclusion (2 cm)		343
218	47	3.3/3.3	100		R5			End drilling 5/11/06 Start drilling 5/12/06 Water measured 27.3 ft	342
219									341
220							Quartz pegmatite mafic inclusion (6 to 7 cm)		340
221	48	5.0/5.0	100	F	R5				339
222									338
223									337
224							Quartz pegmatite with pyrite mineralization		336
225							Quartz pegmatite with mafic inclusion (2 cm)		335
226	49	4.1/4.1	100	F	R5		Calcite healed joints with occasional vug (2 mm x 2 mm)		334
227									333
228							META-QUARTZ DIORITE; bluish gray, black, gray (7.5YR 6/1); fine to medium grained; formation of micaceous minerals mostly near the joints/fractures along with quartz, calcite, K-spar, chlorite, and pyrite		332
229									331
230	50	0.9/0.9	100	F	R5		vug (2 cm x 2 mm), no staining. Calcite crystallization (7 cm x 3 cm)		330
231							Quartz pegmatite (228.9 to 229.5 ft) Mafic dike, fine grained.		329
232	51	5.0/5.0	100	F	R5				328
233									327
234							Mafic inclusion (4 cm x 3 cm)		326
235									325
236	52	5.0/5.0	100	F	R5				324
237							Mafic inclusion (4 cm x 3 cm)		323
238									322
239							K-spar pegmatite (2 cm x 3 cm)		321
240									

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ROCK LOG - Boring No. B-1015

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
240								Calcite mineralization (3 mm)		320
241								META-QUARTZ DIORITE; bluish gray, black gray (7.5YR 6/1); fine to medium grained; thin to very thin in filling along fractures/joints, tight		319
242										318
243		53	5.0/5.0	100	F	R5		Mafic inclusion (3.5 x 2 cm)		317
244								Quartz and K-spar pegmatite (4 cm x 3 cm)		316
245										315
246								META-QUARTZ DIORITE; bluish gray, black, gray (7.5YR 6/1); fine to medium grained; quartz, plagioclase, hornblende, K-spar, calcite, biotite, epidote		314
247										313
248		54	4.0/4.3	93	F	R5		Quartz and K-spar pegmatite (3 cm x 4 cm)		312
249								Quartz pegmatite		311
250									Boring terminated on 5/12/06 at 250.3 ft, overdrilled 0.3 ft not recovered	310
251										309
252										308
253								Total Depth 250.3 ft.		307
254								Groundwater encountered at 4.5 feet		306
255								Borehole Grouted On 1/19/07		305
256										304
257										303
258										302
259										301
260										300
261										299
262										298
263										297
264										296
265										295
266										294
267										293
268										292
269										291
270										290
271										289
272										288
273										287
274										286
275										285
276										284
277										283
278										282
279										281
280										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1016**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 N 1166124 E 1847132		Total Depth 100.2 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 559.2 feet MSL	Ground Water Depth 2.5 feet	Depth to Bedrock 2.8 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 1	Date Started 4/25/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/27/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–1		SPT 1	24 44 50/5	16/17					GP	GRAVEL (GP) with sand Light gray (N 7) slightly damp, dry, very dense, 70% gravel, 29% sand, 17% fines; FILL	Start 4/25/06	559–558
2–3											Switched to NQ core	557–556
4–40												555–520

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1016**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 N 1166124 E 1847132		Total Depth 100.2 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 559.2 feet MSL	Ground Water Depth 2.5 feet	Depth to Bedrock 2.8 feet
Casing Size and Depth 3.5 inch / 5 feet	Length of Core Barrel and Bit 5 feet / 10 feet	No. of Core Boxes 7	Date Started 4/25/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/27/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
3–10		2	8.2/8.2	96	F	R5		META-GRANODIORITE; light bluish gray (10B 7.5/1); medium to coarse grain. CONTINUOUS ROCK	Switched to NQ core	556–549
11–14		3	5.0/5.0	87	F	R5				548–545
15–19		4	5.0/5.0	74	F	R5		META-GRANODIORITE		544–540
20–24		5	5.0/5.0	62	F	R5				539–535
25–29		6	5.0/5.0	80	F	R4 to R5				534–530
30–34		7	5.0/5.0	91	F	R5			End day, 4/25/06 Begin day 4/26/06 Water level at 2.5 ft.	529–525
35–41		8	5.0/5.0	100	F	R5		META-GRANODIORITE		524–518
42										517

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1016

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
43–46		9	5.0/5.0	98	F	R5		META-GRANODIORITE		516–513
46–51		10	5.0/5.0	100	F	R5				513–508
51–56		11	5.0/5.0	100	F	R5				508–503
56–60		12	5.0/5.0	96	F	R5				503–499
60–61					F	R5		META-DIORITE; bluish gray (5B 5/1); medium to fine grain, pervasive calcite veins with epidote		499–498
61–66		13	5.0/5.0	100	F	R5				498–493
66–71		14	4.9/5.0	93	F	R5				493–488
71					F	R5		META-GRANODIORITE; light bluish gray (5B 7.5/1); coarse grained		488
71–76		15	5.0/5.0	91	F	R5				488–483
76–81		16	5.0/5.0	88	F	R5				483–478
81–82										478–477

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1016

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
83–100	17	5.0/5.0	95	F	R5		META-GRANODIORITE		476–459
86–91	18	5.0/5.0	96	F	R5			End day 4/26/06 Begin day 4/27/06; water at 0 ft, (rain)	473–468
89–91				F	R5		META-DIORITE; bluish gray (5B 5/1); medium to fine grain.		470–468
91–96	19	5.0/5.0	100	F	R5		META-GRANODIORITE; light bluish gray (5B 7.5/1); coarse grained		468–463
96–100	20	4.2/4.2	100	F	R5			Coring terminated on 4/27/06 at 100.2 ft	463–459
100–122							Total Depth 100.2 ft. Groundwater encountered at 2.5 feet Borehole Grouted On 4/27/06		459–437

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1017**	
Type and Diameter of Boring HQ core / 3.5 inch	Boring Location Unit 2 N 1166004 E 1847155		Total Depth 175.6 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 560.7 feet MSL	Ground Water Depth 7 feet	Depth to Bedrock 2.3 feet
Casing Size and Depth 4.5 inch / 2.3 feet	Length of Core Barrel and Bit 13.8 feet / 13.8 feet	No. of Core Boxes 14	Date Started 5/28/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 6/7/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
0–2								Gravel FILL	Drilled through gravel with 4 inch roller bit, no sample	560–559
3–7		1	4.7/5.0	48	SW	R4		META-GRANODIORITE; light bluish gray (Gley 2), medium to coarse grained.	Begin HQ core 5/29/06 RQD artifically low due to historic CNS blasting and excavation methods (mechanically disturbed)	558–554
7–8		2	1.6/1.6	100	SW	R4		SAA CONTINUOUS ROCK		553–552
8–13		3	4.8/4.8	88	SW	R4				551–548
13–15		4	1.5/1.5	100	SW	R4				547–546
15–18		5	3.4/3.5	97	F	R4 to R5				545–543
18–23		6	4.0/4.0	100	F	R4 to R5				542–538
23		7	0.8/0.8	100	F	R4 to R5			End of 5/29/06 Begin day 5/30/06	
23–29		8	5.5/5.5	100	F F F F F	R4 to R5 R4 to R5 R4 to R5 R4 to R5 R4 to R5		From 25.7 to 26.4 ft, metadiorite vein; dark bluish gray (5PB 4.5/1) fine grained, From 26.7 to 27.2 ft, metadiorite vein; dark bluish gray (5PB 4.5/1) fine grained META-GRANODIORITE; light bluish gray (5PB 7/1); medium to coarse grained		537–532
29–32		9	3.0/3.0	100	F	R4 to R5				531–529
32–34		10	2.0/2.0	100	F	R4 to R5				528–527
34–36		11	2.0/2.0	100	F	R4 to R5				526–525
36–39		12	3.0/3.0	100	F	R4 to R5				524–522
39–40										521

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1017

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–43	13	4.4/4.4	100	F	R4 to R5		META-GRANODIORITE		520–518
43–49	14	5.6/5.6	74	F	R4 to R5				517–512
49–51	15	2.5/2.5	74	F	R4 to R5				511–510
51–53	16	2.0/2.0	58	F	R4 to R5				509–508
53–59	17	5.4/5.5	79	F	R4 to R5				507–502
58–59				F	R4		META-DIORITE; bluish gray (5PB 5/1) fine grained from 57.9 to 58.4 ft		503
59				F	R4 to R5				502
59–64	18	5.0/5.0	86	SW	R4 to R5 / R4		META-GRANODIORITE; light bluish gray (5PB 7/1); medium grained		501–497
64–67	19	2.8/3.0	77	SW	R4				496–494
67–69	20	2.0/2.0	100	F	R4 to R5				493–492
69–72	21	3.5/3.5	87	F	R4 to R5			End of 5/30/06 Begin day 5/31/06 Water level 10 ft.	491–489
72–74	22	1.5/1.5	100	F	R4 to R5		META-GRANODIORITE		488–487
74–79	23	5.0/5.0	100	F	R4 to R5				486–482
79–80									481

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ROCK LOG - Boring No. B-1017

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
24	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE	
25	5.0/5.0	98	F	R4 to R5			
26	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1), medium grained, equigranular	
27	5.0/5.0	97	F	R4 to R5			
28	5.0/5.0	96	F	R4 to R5			
29	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1), medium grained, equigranular	
30	5.0/5.0	100	F	R4 to R5		Massive quartz vein ~1.3 inch thick	End of 5/31/06 Begin day 6/5/06
31	2.0/2.0	100	F	R4 to R5		Mafic xenolith	
32	3.0/3.0	100	F	R4 to R5			

Depth (feet): 80–120
Elevation (feet): 480–441

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ROCK LOG - Boring No. B-1017

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
33	4.0/4.0	100	F	R4 to R5			
34	6.0/6.0	100	F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1), medium grained, equigranular	End of 6/5/06 Begin day 6/6/06 Water level 7 ft
35	5.0/5.0	100	F	R4 to R5			
36	5.0/5.0	100	F	R4 to R5			
37	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE	
38	5.0/5.0	97	F	R4 to R5			
			F	R4		META-DIORITE; bluish gray to dark bluish gray (5PB 4.5/1) fine to medium grained	
			F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1); medium grained	
39	4.9/5.0	98	F	R4 to R5			
			F	R4 to R5		META-DIORITE; dark bluish gray and white, (5B 4/1 and 8/N), medium grained	
			F	R4 to R5		META-GRANODIORITE; light bluish gray (5PB 7/1); medium to coarse grained	
40	2.3/3.0	94	F	R4 to R5			
41	2.0/2.0	100	F	R4 to R5		SAA; bluish gray (10B 5/1)	End of day 6/6/06 Begin day 6/7/06, Water level 6.3 ft.

Depth (feet): 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160

Elevation (feet): 440, 439, 438, 437, 436, 435, 434, 433, 432, 431, 430, 429, 428, 427, 426, 425, 424, 423, 422, 421, 420, 419, 418, 417, 416, 415, 414, 413, 412, 411, 410, 409, 408, 407, 406, 405, 404, 403, 402, 401

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ROCK LOG - Boring No. B-1017

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
160										400
161		42	5.0/5.0	94	F	R4 to R5				399
162										398
163										397
164								META-GRANODIORITE; bluish gray (10B 5/1), medium to coarse grained, equigranular		396
165										395
166		43	5.0/5.0	100	F	R4 to R5				394
167										393
168										392
169								SAA		391
170										390
171										389
172		44	6.6/6.6	100	F	R4 to R5				388
173										387
174										386
175										385
176									Coring terminated on 6/7/06	384
177										383
178								Total Depth 175.6 ft.		382
179								Groundwater encountered at 7 feet		381
180								Borehole Grouted On 1/17/07		380
181										379
182										378
183										377
184										376
185										375
186										374
187										373
188										372
189										371
190										370
191										369
192										368
193										367
194										366
195										365
196										364
197										363
198										362
199										361
200										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1018**	
Type and Diameter of Boring NQ core / 3 inch	Boring Location Unit 2 N 1166028 E 1847265		Total Depth 100 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 552.7 feet MSL	Ground Water Depth 2.75 feet	Depth to Bedrock 0 feet
Casing Size and Depth none	Length of Core Barrel and Bit 5 feet / 10 feet	No. of Core Boxes 6	Date Started 4/13/06
	Borehole Inclination -90	Logged by G. Maximov/M.Angell	Date Completed 4/17/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	Lithology	Remarks
1	6.5/7.0	23	SW	R4	META-GRANODIORITE; light bluish gray (10B 7.5/1), medium to coarse grained Fracture zone 0.2 to 11.8 ft	Start 4/13/06
2	3.4/4.0	28	SW TO F	R4 TO R5		End 4/13/06 Start 4/14/06
3	4.4/5.0	44	SW	R3 TO R4	META-GRANODIORITE	
4	5.0/5.0	80	F	R4	SAA CONTINUOUS ROCK	100% water loss
5	5.0/5.0	94	F	R4		
6	5.0/5.0	76	F	R4 R2 R4	META-DIORITE; dark greenish gray, healed mylonite shear zone with inclusions (Porphyroblasts) of quartz and feldspar and quartz stringers (recrystallized)	
					META-GRANODIORITE; light bluish gray (10B 7.5/1); medium to coarse grained.	
7	5.0/5.0	96	F	R4	META-DIORITE; dark greenish gray; fine grained, equigranular with abundant quartz veins (~0.4 ft spacing)	
8	5.0/5.0	95	F	R4		

Depth (feet): 0–40. Elevation (feet): 552–513.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1018

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	5.0/5.0	91	F	R4		META-DIORITE; greenish gray (5BG 5.5/1); medium to fine grained, equigranular, with quartz veins, veins/lenses of calcite.	
10	5.0/5.0	97	F	R5			
11	5.0/5.0	84	F	R5			
12	5.0/5.0	98	F	R5		SAA; fine grained, strong foliation; mylonitic texture Mylonite zone from 56.6 to 65.7 ft META-GRANODIORITE zone; light bluish gray (5PB 7/1) medium grained, from 56.9 to 57.2 ft SAA; clear foliation ~60°, mylonitic texture META-DIORITE	
13	5.0/5.0	100	F	R5		META-GRANODIORITE; light bluish gray (5PB 7/1), medium grained increased fracture frequency totaly to moderately healed Meta-diorite zone as above from 62.2 to 62.7 ft	End of 4/14/06 Start day 4/15/06 Water level at 2 ft.
14	5.0/5.0	88	F	R5			
15	4.9/5.0	93	F	R5			
16	5.0/5.0	100	F	R5			

Depth (feet): 40–80
Elevation (feet): 512–473

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1018

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
							End of 4/15/06 Start day 4/17/06 Water level at 3.5 ft.
17	5.0/5.0	100	F	R5		META-GRANODIORITE Widely spaced totally healed fractures.	
18	5.0/5.0	100	F	R5			
19	5.0/5.0	100	F	R5		META-GRANODIORITE	
20	4.0/4.0	100	F	R5			
						Total Depth 100 ft. Groundwater encountered at 2.75 feet Borehole Grouted On 4/17/06	Coring terminated on 4/17/06

Depth (feet): 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120

Elevation (feet): 472, 471, 470, 469, 468, 467, 466, 465, 464, 463, 462, 461, 460, 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447, 446, 445, 444, 443, 442, 441, 440, 439, 438, 437, 436, 435, 434, 433

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1019**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 adjacent N 1166204 E 1847001		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 558.2 feet MSL	Ground Water Depth 15 feet	Depth to Bedrock 12 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 2	Date Started 4/18/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/24/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										GRAVEL FILL	Start 4/18/06	558
1									SM	SAND silty (SM), dark yellowish brown (10YR 4/6) to light olive brown (2.5Y 5/4), damp, very dense, fine sand, 40% fines. SAPROLITE		557
2												556
3												555
4		SPT 1	7 22 50	13.2 / 18								554
5												553
6												552
7												551
8												550
9		SPT 2	50/5.5	5.5 / 5.5						SAA, olive brown (2.5Y 4/4), moist, fine/medium sand, 40% fines. SAPROLITE	Switched to NQ rock coring	549
10												548
11												547
12												546
13												545
14												544
15												543
16												542
17												541
18												540
19												539
20												538
21												537
22												536
23												535
24												534
25												533
26												532
27												531
28												530
29												529
30												528
31												527
32												526
33												525
34												524
35												523
36												522
37												521
38												520
39												519
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1019**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 adjacent N 1166204 E 1847001		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 558.2 feet MSL	Ground Water Depth 15 feet	Depth to Bedrock 12 feet
Casing Size and Depth 3 inch / 9 feet	Length of Core Barrel and Bit 5 feet / 10 feet	No. of Core Boxes 4	Date Started 4/18/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 4/24/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
9–11		1	0.0/3.0	0	CW	R0		NO RECOVERY. SAPROLITE or PARTIALLY WEATHERED ROCK	Refusal, switched to NQ coring 4/18/06	549–548–547
12–14		2	3.4/5.0	19	HW TO MW	R2 TO R3		METAGRANODIORITE; light bluish gray (10B 7.5/1); medium grained, but highly weathered and oxidized		546–545
14–17		2			MW	R2 TO R3		METADIORITE; dark bluish gray (5PB 3.5/1); fine grained, very oxidized		544–543–542
17–19		3	2.9/5.0	7	MW	R3		SAA, bluish gray (10B 5/1)		541–540
19–22		3			SW	R4				539–538–537
22–27		4	5.0/5.0	93	F	R5		SAA CONTINUOUS ROCK		536–535–534–533–532
27–32		5	4.9/5.0	93	F	R5		SAA with pervasive quartz/calcite veins		531–530–529–528–527
32–37		6	5.0/5.0	93	F	R5		META-GRANODIORITE; light bluish gray (5PB 6.5/1); medium grained, poorly developed foliation		526–525–524–523–522
37–42		7	4.7/5.0	88	F	R5				521–520–519–518–517
42–47		8	4.8/5.0	96	F	R5			End of day 4/18/06 Begin day 4/19/06 Water level 14 ft	516–515–514–513–512–511
47–49								META-DIORITE; bluish gray (5B 5.5/1); fine to medium		510

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1019

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	4.7/5.0	94	F	R5		grained, grading to fine grained away from contact with metagranodiorite	
10	5.0/5.0	100	F	R5			End of day 4/19/06 Begin day 4/24/06 Water level 15 ft.
			F			META-GRANODIORITE; light bluish gray (5PB 6.5/1); medium grained	
11	4.8/5.0	96	F F	R5 R5		META-DIORITE dike; bluish gray (5B 5.5/1); fine grained, from 57.5 to 59 ft	
			F	R5		META-GRANODIORITE; light bluish gray (5PB 6.5/1); medium to coarse grained	
12	5.0/5.0	100	F	R5		META-GRANODIORITE	
13	4.9/5.0	98	F	R5			
14	3.0/3.0	100	F	R5			
						Total Depth 75 ft. Groundwater encountered at 15 feet Borehole Grouted On 4/24/06	Coring terminated on 4/24/06

Depth (feet): 49–89
Elevation (feet): 509–470

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1020**	
Type and Diameter of Boring Hollow stem auger / HQ core / 7 inch	Boring Location Unit 2 adjacent N 1166389 E 1847104		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 590 feet MSL	Ground Water Depth 35.3 feet	Depth to Bedrock 14.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 3	Date Started 4/4/06
	Borehole Inclination -90	Logged by E. Weldon/M. Angell	Date Completed 4/11/06

Reviewed by / Date B. Reinicker 5/3/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, sandy (ML), yellowish brown (10YR 5/4) damp, stiff, <20% sand <10% clay, low plasticity, black manganese oxide veining. SAPROLITE	Start on 4/4/06	590
1												589
2												588
3												587
4		SPT 1	4 4 5	18/18								586
5												585
6												584
7												583
8									SM	SAND silty (SM); dark yellowish brown, (10YR 4/4), damp, dense, <40% silt, low plasticity, angular grains; SAPROLITE		582
9		SPT 2	6 17 19	16/18								581
10												580
11												579
12									SM	SPT Refusal, PARTIALLY WEATHERED ROCK	Difficult drilling	578
13											Tricone refusal at 13.5 ft, see rock log	577
14		SPT 3	50/0.5	0.5/0.5								576
15												575
16												574
17												573
18												572
19												571
20												570
21												569
22												568
23												567
24												566
25												565
26												564
27												563
28												562
29												561
30												560
31												559
32												558
33												557
34												556
35												555
36												554
37												553
38												552
39												551
40												550

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1020**	
Type and Diameter of Boring Hollow stem auger / HQ core / 7 inch	Boring Location Unit 2 adjacent N 1166389 E 1847104		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 590 feet MSL	Ground Water Depth 35.3 feet	Depth to Bedrock 14.5 feet
Casing Size and Depth 4.5 inch / 12 feet	Length of Core Barrel and Bit 8 feet / 7 feet	No. of Core Boxes 5	Date Started 4/4/06
	Borehole Inclination -90	Logged by E. Weldon/M. Angell	Date Completed 4/11/06

Reviewed by / Date B. Reinicker 5/3/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
14								No core recovery; PARTIALLY WEATHERED ROCK	Begin HQ rock core Low water return	576
15–18		1	3.5/4.5	64	MW	R2 TO R3		META-QUARTZ DIORITE; white gray and reddish yellow ; fine to coarse grained; xenoblastic texture; >40% feldspar, 30% quartz, fracture surfaces are stained red and black (Fe and Mn oxides?); black xenoliths occasional, fine grained (~1 to 4 cm)		575–572
19–22		2	3.5/5.0	60	HW TO MW			SAA mafic inclusions offset less than (0.5 cm) by subvertical fractures (healed). Mafic inclusions very fine grained, greenish color		571–568
23–26		3	4.7/5.0	89	SW	R3 TO R4		META-QUARTZ DIORITE; black, dark gray, and light gray (5PB 6.5/1), xenoblastic, 20 to 40% mafics, chlorite, mica, hornblende, medium grained CONTINUOUS ROCK		567–564
27–30		4	5.0/5.0	96	F	R4				563–560
31–34		5	5.0/5.0	100	F	R4		34.3 to 34.6 ft Meta-diorite dike		559–556
35–38		6	5.0/5.0	96	F	R4			Resume drilling 4/11/06	555–552
39–43		7	5.0/5.0	100	F	R4		META-GRANODIORITE; coarse grained with local mineralogical banding of mafic minerals; randomly spaced.		551–547
44–48		8	5.0/5.0	96	SW	R4				546–542
49–53										541–537

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1020

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
54		9	5.0/5.0	87	SW	R3				536
55										535
56										534
57					F	R4		56.3 to 57.7 ft healed fracture zone		533
58		10	5.0/5.0	96	F	R4		META-GRANODIORITE; medium to coarse grained		532
59								59.2 to 59.7 ft mafic inclusion		531
60										530
61										529
62										528
63		11	5.0/5.0	100	F	R4				527
64								63.5 to 66.2 ft minor mafic inclusions		526
65										525
66										524
67								META-GRANODIORITE		523
68		12	5.0/5.0	100	F	R4				522
69										521
70										520
71								From 70.8 to 71.5 ft, massive quartz with pyrite and muscovite		519
72										518
73								META-GRANODIORITE; accessory minerals include pyrite, muscovite, and epidote		517
74		13	2.0/2.0	95	F	R4				516
75									Coring terminated on 4/11/06; water at 37.3 ft 4/12/06; water at 35.3 ft	515
76										514
77										513
78								Total Depth 75 ft.		512
79								Groundwater encountered at 35.3 feet		511
80								Borehole Grouted On 4/26/06		510
81										509
82										508
83										507
84										506
85										505
86										504
87										503
88										502
89										501
90										500
91										499
92										498
93										497

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1021**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch	Boring Location Unit 2 adjacent N 1165897 E 1847301		Total Depth 75.4 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 565.5 feet MSL	Ground Water Depth 10 feet	Depth to Bedrock 5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 1	Date Started 4/12/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SM	SAND silty (SM), brownish yellow, (10YR 6/6), moist, ~12% silt, some gravel (~15%) PARTIALLY WEATHERED ROCK	Start 4/12/06	565
1												564
2												563
3												562
4		SPT 1	46 50/3	9							Refusal at 5 ft., see rock log	561
5												560
6												559
7												558
8												557
9												556
10												555
11												554
12												553
13												552
14												551
15												550
16												549
17												548
18												547
19												546
20												545
21												544
22												543
23												542
24												541
25												540
26												539
27												538
28												537
29												536
30												535
31												534
32												533
33												532
34												531
35												530
36												529
37												528
38												527
39												526
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1021**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch	Boring Location Unit 2 adjacent N 1165897 E 1847301		Total Depth 75.4 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 565.5 feet MSL	Ground Water Depth 10 feet	Depth to Bedrock 5 feet
Casing Size and Depth 4 inch / 5 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 4	Date Started 4/12/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
5–6		2	1.7/3.0	0	MW	R2		META-GRANODIORITE; bluish gray (5PB 5/1); massive, fine to medium grained; few to some mafic xenoliths	Refusal, begin NQ core	560
6–9		3	4.8/5.0	30	MW	R2		▽	50% water loss	559–556
13–14		4	1.6/2.0	0	MW	R2				553–552
15–17		5	3.0/3.0	66	MW	R2 TO R3			50% water loss	551–549
18–22		6	5.0/5.0	61	MW	R3		SAA, increase in size of mafic xenoliths		548–545
23–27		7	5.0/5.0	94	SW	R3 TO R4		SAA, decrease in size of mafic xenoliths CONTINUOUS ROCK		542–539
28–32		8	4.9/5.0	85	SW	R3 TO R4		SAA; bluish gray to greenish gray (5PB 5/1 to 10G 5/1); massive, fine to medium grained, some mafic xenoliths, some altered plagioclase (pink crystals) found near fractured zones	About one-third water loss	537–533
33–37		9	4.6/5.0	84	SW	R3 TO R4				532–529
38–39		10	2.0/2.0	100	SW	R3 TO R4			End of day 4/12/06 Start of day 4/13/06 Water level 10 ft	528–527
40–42		11	3.0/3.0	90	SW	R4		META-GRANODIORITE; bluish gray (5PB 5/1); massive, fine to medium grained, some mafic xenoliths		526–524
43–45								Many healed incipient fractures (with calcite)		523–521

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1021

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
45–48	12	4.4/5.0	88	SW	R4				520–517
48–53	13	5.0/5.0	96	SW TO F	R4				517–512
53–58	14	4.9/5.0	98	SW	R4		Two minor healed shears, with calcite	40 to 50% water loss	512–507
58–63	15	4.8/5.0	93	SW	R4		Mafic xenoliths randomly oriented (>4 inch long), maybe very weak foliation expressed as zones of mafic mineral accumulation		507–502
63–68	16	5.0/5.0	100	SW	R4				502–497
68–73	17	5.0/5.0	100	SW	R4		Some mafic xenoliths, incipient fractures with minor offset Subvertical quartz vein at ~71.5 ft	40% water loss	497–492
73–75	18	2.4/2.4	100	SW	R4		Some mafic xenoliths	Coring terminated at 75 ft on 4/13/06	492–490
76–85							Total Depth 75.4 ft. Groundwater encountered at 10 feet Borehole Grouted On 4/13/06		489–481

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1022**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch/3 inch	Boring Location Unit 2 adjacent N 1165733 E 1847334		Total Depth 76 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 571.5 feet MSL	Ground Water Depth 11.1 feet	Depth to Bedrock 40 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 16	Date Started 4/4/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/5/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT sandy (ML) red (2.5YR 5/8), medium stiff, fine to coarse sand, ~15% sand, apparent relict rock texture, but very weathered. Texture is not continuous throughout, RESIDUUM	Begin drilling on 4/4/06	571–568
4–5	✓	SPT 1	1 3 3	14.4/18								567
6–8												566–564
9–10	✓	SPT 2	1 4 4	18/18					ML ▽	SILT sandy (ML), brownish yellow (10YR 6/8), medium stiff, fine to medium sand, ~15 to 20% sand, SAPROLITE		563–562
11–13												561–559
14–15	✓	SPT 3	1 2 2	18/18						SAA		558–557
16–18												556–554
19–20	✓	SPT 4	5 8 11	12/18						SAA, very pale brown to brownish yellow (10YR 8/2 to 10 YR 6/8), damp, very stiff, ~30% sand, SAPROLITE		553–552
21–23												551–549
24–25	✓	SPT 5	7 13 28	15.6/18						SAA; hard		548–547
26–28												546–544
29–30	✓	SPT 6	8 13 17	18/18						SILT sandy (ML), light olive brown (2.5YR 5/2), damp, very stiff, 15 to 20% sand, SAPROLITE		543–542
31–33												541–539
34–35	✓	SPT 7	7 16 19	18						SILT (ML), dark olive gray (5Y 3/2), damp, hard, very sand <5% (very fine to fine sand), SAPROLITE		538–537
36–38												536–534
39–40	✓	SPT 8	6 19 50/4	16					ML	SILT (ML), dark olive gray to yellowish brown (5Y 3/2 to 10YR 5/6)	Refusal at 40 ft., see rock log	533–532

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1022**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch/3 inch	Boring Location Unit 2 adjacent N 1165733 E 1847334		Total Depth 76 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 571.5 feet MSL	Ground Water Depth 11.1 feet	Depth to Bedrock 40 feet
Casing Size and Depth 4 inch / 40 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 3	Date Started 4/4/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/5/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
40–41	9	2.0/3.0	42	MW to SW	R3 to R4		META-GRANODIORITE to META-QUARTZ DIORITE; bluish gray (5PB 5/1); massive, fine to medium grained	Tricone refusal at 40 ft, begin NQ core	531–530
42–46	10	5.0/5.0	91	SW	R4		SAA CONTINUOUS ROCK		529–526
47–48	11	0.5	70	SW	R4			Very hard drilling	525–523
48–52	12	0.5 3.0/4.5	76	SW	R4		Likely incipient joints along foliation.		523–519
53–57	13	5.0/5.0	94	SW	R4		META-QUARTZ DIORITE; bluish gray (10B 5/1), massive; fine to medium grained; weakly foliated (many incipient joints with preferred orientation); some dissolution pits; quartz pegmatite veins show minor offset along healed fractures, calcite and epidote infilling the healed joints	End of day 4/4/06 Start of day 4/5/06 Water level 11.1 ft.	518–514
58–61	14	5.0/5.0	91	SW	R3 to R4		META-DIORITE; dark greenish gray (5G 4/1); massive; fine grained; weakly foliated, joints break along foliation, calcite is primarily mineralizing along foliation joints and healed incipient fractures		513–510
62–66	15	5.0/5.0	100	SW	R4		META-QUARTZ DIORITE; bluish gray (10B 5/1), massive; fine to medium grained; weakly foliated (many incipient joints with preferred orientation); some dissolution pits; quartz pegmatite veins are offset by healed fractures, calcite and epidote are primary mineral within the healed joints META-DIORITE; dark greenish gray (5G 4/1); fine grained; massive; weakly foliated; epidote and calcite are the primary mineral within healed fractures		509–504
67–75	16	8.0/8.0	100	SW	R4		META-DIORITE; SAA	Coring terminated on 4/5/06	503–496
76–80							Total Depth 76 ft. Groundwater encountered at 11.1 feet		495–492

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1022

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
80										491
81								Borehole Grouted On 4/5/06		490
82										489
83										488
84										487
85										486
86										485
87										484
88										483
89										482
90										481
91										480
92										479
93										478
94										477
95										476
96										475
97										474
98										473
99										472
100										471
101										470
102										469
103										468
104										467
105										466
106										465
107										464
108										463
109										462
110										461
111										460
112										459
113										458
114										457
115										456
116										455
117										454
118										453
119										452
120										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1023**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch	Boring Location Unit 2 adjacent N 1165696 E 1847233		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 571.2 feet MSL	Ground Water Depth 8 feet	Depth to Bedrock 27 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 4/10/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/11/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML), olive yellow (2.5Y 6/8), damp, medium stiff, ~15% sand, fine sand, RESIDUUM	Begin 4/10/06	571–568
4–5		SPT 1	2 4 4	14.4/18								567
6–8									∇			566–563
9–10		SPT 2	2 3 4	14.4/18						SAA		562–561
12–13									ML	SILT, sandy (ML), olive yellow to light gray (2.5Y 6/8 to 5Y 7/2), damp, very stiff, ~15 to 20% sand. SAPROLITE		559–558
14–15		SPT 3	4 9 10	18								557–556
19–20		SPT 4	7 11 11	12/18						SILT, sandy (ML), light gray, (2.5Y 7/2) to light olive brown (2.5Y 5/4), damp, very stiff ~25 % sand (fine sand), SAPROLITE		553–551
24–25		SPT 5	11 11 26	15.6/18						SILT, sandy (ML), brownish yellow, (10YR 6/8), to light gray (2.5Y 7/2), damp, hard, ~35-40% fine to medium sand. SAPROLITE		548–546
27		SPT 6	50/2	2/2							Refusal at 27 ft, see rock log	545–544
28–40												543–532

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1023**	
Type and Diameter of Boring Wash Rotary / NQ core / 5 inch	Boring Location Unit 2 adjacent N 1165696 E 1847233		Total Depth 75 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 571.2 feet MSL	Ground Water Depth 8 feet	Depth to Bedrock 27 feet
Casing Size and Depth 4 inch / 27 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 3	Date Started 4/10/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 4/11/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
27–32		7	4.5/5.0	32	MW	R1 to R2		METAGRANODIORITE; light bluish gray (5PB 8/1) to reddish yellow (7.5YR 6/8); massive; fine to medium grained	NQ rock coring begins 4/10/06	544–540
32–37		8	5.0/5.0	75	SW	R3		SAA; Light bluish gray (5PB 8/1); very weak foliation expressed as joints; some zones appear to be brecciated and healed CONTINUOUS ROCK		539–535
37–42		9	4.5/5.0	94	SW	R3		SAA; light bluish gray to bluish gray (5PB 8/1 to 10B 6/1); many healed joints with calcite mineralization and some epidote, some mafic xenoliths randomly distributed.	End of day 4/10/06 Start of day 4/11/06 Water level 8 ft. Sharpen bit with sand	534–530
42–47		10	5.0/5.0	98	SW	R3 to R4		SAA; bluish gray (10B 6/1); massive; fine to coarse grained, very weakly foliated, biotite mineral groups appear to be slightly elongated along foliation, many healed foliation joints and fractures with calcite mineralization, mafic xenoliths (randomly oriented).		529–525
47–52		11	5.0/5.0	94	SW	R3 to R4				524–520
52–57		12	5.0/5.0	75	SW	R3 to R4		SAA; dark bluish gray (10B 4/1); very weakly foliated, some to many mafic xenoliths		519–515
57–62		13	4.8/5.0	89	SW	R3		SAA; massive to weakly foliated; fine to medium grained; zone of brecciation (healed) Numerous mafic xenoliths, many healed to partly healed joints (w/calcite), some dissolution pits along partly healed joints.		514–510
62–64		14	2.3/2.5	27	MW to SW	R2 to R3		SAA, cut by high angle (80°) meta-diorite dike		509–507
64–67		15	2.5/2.5	80	SW	R3		SAA; dark bluish gray (10B 4/1), fine to medium grained; massive to weakly foliated		506–505

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1023

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
67–75		16	4.9/5.0	90	SW	R3 to R4		SAA; between 67 to 69 ft. highly sheared (mylonitic textures interfingered with fine grained meta-diorite and pegmatitic quartz veins at 70 ft. Epidote mineralization increases and appears to be replacing plagioclase within the matrix and calcite healed fracture.		504–499
72–75		17	3.0/3.0	71	SW	R3 to R4		META-GRANODIORITE; dark bluish gray with green; fine to medium grained; massive to very weakly foliated; epidote mineralization between 72 and 73.5 ft. Some mafic xenoliths		499–497
75								META-DIORITE; greenish black (5G 2.5/1); very fine grained; massive; weakly foliated	Coring terminated 4/11/06	496
75–107								Total Depth 75 ft. Groundwater encountered at 8 feet Borehole Grouted On 4/11/06		496–465

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1024**	
Type and Diameter of Boring NQ / HQ core / 3 inch	Boring Location Unit 2 adjacent N 1166077 E 1846927		Total Depth 220.2 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 539.4 feet MSL	Ground Water Depth 13.1 feet	Depth to Bedrock 1 feet
Casing Size and Depth 3 inch / 1 feet	Length of Core Barrel and Bit 7 feet / 12 feet	No. of Core Boxes 17	Date Started 3/13/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 3/20/06

Reviewed by / Date F. Syms 6/6/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
1	1.6 / 2.0	0	SW to F	R3 to R4		META-DIORITE; quartz vein with some epidote mineralization upper 4 inches	Begin NQ 3/13/06
2	5.0 / 5.0	86	SW to F	R4		META-GRANODIORITE; bluish gray (10B 5/1); equigranular SAA; numerous quartz veins; weak to moderate fabric; slight foliation CONTINUOUS ROCK	At 3 ft begin HQ
3	4.0 / 4.0	83	SW to F	R3 to R4		SAA; quartz, plagioclase and biotite are the primary minerals; chalcopyrite, pyrite, and chlorite are secondary minerals	Hard drilling
4	1.0 / 1.0	100	SW to F	R4			Stopped drilling 3/13/06. Resume drilling 3/15/06; Water at 7.33 ft
5	1.5 / 2.0	75	SW to F	R4		Numerous quartz veins and calcite filled discontinuities	
6	3.0 / 3.0	98	SW to F	R3		Numerous healed fractures remineralized with quartz and calcite.	100% water loss
7	5.0 / 5.0	83	SW	R3		Numerous incipient fractures with probable dissolution features along fracture margins	Still losing water
8	1.8 / 2.0	90	SW to F	R4 to R5		Mylonitic fabric, healed	Losing water
9	1.5 / 2.0	80	SW to F	R4			
10	1.5 / 2.0	75	SW to F	R3 to R4			
11	5.0 / 5.0	96	SW to F	R3 to R4		SAA; calcite, chlorite, and quartz are the predominant fracture filling materials; minor pyrite present	Losing water
12	4.5 / 5.0	63	SW	R3		Quartz, calcite, and possible K-spar mineralization along veins	End drilling 3/15/06. Begin drilling 3/16/06; water at 17.67 ft Losing water
							Losing water

Depth (feet): 1–41. Elevation (feet): 538, 537, 536, 535, 534, 533, 532, 531, 530, 529, 528, 527, 526, 525, 524, 523, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510, 509, 508, 507, 506, 505, 504, 503, 502, 501, 500, 499.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1024

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
13	4.8/5.0	76	SW	R3		SAA; incipient and healed fractures remineralized with calcite	
14	4.8/5.0	89	SW to F	R4			
15	2.0/2.0	100	F	R4 to R5			
16	3.0/3.0	91	F	R5		Large quartz vein cuts core at 52 ft, and many irregular veins, incipient fractures filled by calcite.	
17	1.5/1.5	100	F	R5			Hard drilling
18	2.4/2.5	96	F	R4 to R5			
19	6.0/6.0	94	F / SW to F	R4 to R5		META-DIORITE; dark gray to black; very fine grained; epidote mineralization along joints and within matrix; numerous white veins in calcite	
						META-GRANODIORITE; bluish gray (10B 5/1); quartz, plagioclase, and biotite; calcite and quartz in thin veins (<1 cm)	
20	5.0/5.0	98	F	R4 to R5		SAA; few calcite filled incipient fractures, few quartz veins, weak to very weak gneissic fabric (foliation)	
21	4.7/5.0	94	SW to F	R4			End drilling 3/16/06. Begin drilling 3/17/06 water at 17.4 ft
22	5.0/5.0	80	SW to F	R3 to R4		SAA, interfingered with strongly foliated vein of mafic schist; schist is very fine grained with some apparent epidote along calcite veins	
							Losing water

Depth (feet): 41–81
Elevation (feet): 498–459

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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1024

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
23	4.9/5.0	89	F	R4			
24	3.0/3.0	87	SW to F	R3 to R4		META-DIORITE; black to dark gray; very fine grained; mafic minerals epidote visible within matrix and along calcite veins, calcite veins randomly oriented to foliation surfaces.	Hard drilling
25	2.0/2.0	100	F	R4			Hard drilling
26	5.0/5.0	96	SW to F	R4 to R5		SAA; Dark gray black to dark green very fine grained, epidote visible, calcite veins follow foliation but also occur randomly 89 to 92.2 ft.	Losing water
						META-GRANODIORITE, quartz, plagioclase, biotite gneiss, some mafic xenoliths, random calcite veins	
27	4.9/5.0	93	SW to F	R4 to R5		META-GRANODIORITE; bluish gray (10B 5/1); quartz feldspar with biotite and epidote, incipient fractures mineralized with quartz and minor calcite; large accumulation of quartz and probable feldspar at 96 ft.	Losing some water
28	5.0/5.0	100	F	R4 to R5		META-DIORITE; black to dark gray; very fine grained; mafic mineral; epidote visible within matrix and along calcite veins.	
29	4.7/5.0	94	F	R4 to R5			Faster drilling
30	4.9/5.0	94	F	R4 to R5			
31	4.8/5.0	96	F	R4 to R5		SAA; greenish gray to black, many little porphyroblasts, calcite, and epidote from prominant veins along weak foliation; biotite, chlorite	
						META-DIORITE; gray to greenish black; very fine grained	End of drilling 3/17/06. Start drilling 3/18/06; water at 13.5 ft

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1024

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
32	4.8/5.0	96	F	R4 to R5		Massive gray to greenish black, matrix equigranular.	
33	5.0/5.0	98	F	R4 to R5			
34	4.8/5.0	92	F	R4 to R5			
35	4.9/5.0	88	F	R4			Losing water
36	4.8/5.0	84	F	R3 to R4		META-GRANODIORITE; bluish gray (10B 5/1); medium to coarse grained; weak to very weak foliation; quartz plagioclase, and biotite; numerous incipient fractures mineralized with calcite, numerous mafic xenoliths	Harder drilling
37	4.9/5.0	77	F	R4 to R5		SAA	End of drilling 3/18/06. Start drilling 3/19/06; water at 15.2 ft
38	4.3/5.0	72	SW to F	R4			
39	4.8/5.0	92	SW to F	R3 to R4		Some epidote along margins of quartz veins.	Losing some water
40	2.0/2.0	85	F	R3 to R4			

Depth (feet): 121–161
Elevation (feet): 418–379

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1024

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
41	1.0/1.0	95	F	R3 to R4			
42	2.0/2.0	100	F	R4			
43	4.9/5.0	92	SW to F	R3 to R4			Water return
44	3.9/4.0	89	SW to F	R3 to R4		Quartz pegmatite veins	
45	6.0/6.0	97	SW to F	R4 to R5			
						META-DIORITE; fine grained; weak foliation plagioclase biotite, hornblende; phenocrysts, minor thin calcite veins along healed incipient fractures.	
46	4.8/5.0	95	F	R3 to R4		Dark greenish gray; very fine grained; biotite, hornblende, plagioclase gneiss. Epidote and calcite form veins along ~ 60° foliation. Epidote veins up to 0.5 inch wide.	End of drilling 3/19/06. Start drilling 3/20/06; water at 13.1 ft
47	4.8/5.0	96	F	R4 to R5		Plagioclase and epidote rich zone appears to cross the foliation	
48	4.9/5.0	98	F	R4 to R5			
49	4.7/5.0	94	F	R4 to R5		Numerous calcite veins along foliation	Losing some water
						META-GRANODIORITE; plagioclase, quartz, biotite, heavily brecciated in sections that have undergone some	

Depth (feet): 161–201; Elevation (feet): 378–339

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1024

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
201		50	5.3/5.3	100	SW to F	R3 to R4		shearing healed. Numerous random incipient fractures.		338
202										337
203										336
204										335
205		51	4.7/4.7	100	SW to F	R3 to R4		Quartz pegmatite veins with healed highly brecciated zone		334
206										333
207										332
208										331
209		52	4.0/4.0	90	SW to F	R4 to R5				330
210										329
211										328
212								2.5 to 3 inch wide quartz vein associated with a zone of healed brecciation	Losing some water	327
213										326
214		53	7.2/7.2	94	SW to F	R4 to R5		High density of random incipient fractures mineralized with calcite.		325
215										324
216										323
217										322
218										321
219										320
220									End of drilling 3/20/06, coring terminated	319
221								Total Depth 220.2 ft. Groundwater encountered at 13.1 feet Borehole Grouted On 6/13/06		318
222										317
223										316
224										315
225										314
226										313
227										312
228										311
229										310
230										309
231										308
232										307
233										306
234										305
235										304
236										303
237										302
238										301
239										300
240										299
241										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1025**	
Type and Diameter of Boring Wash Rotary / NQ core / 3.5 inch	Boring Location Unit 1 CT N 1165263 E 1845471		Total Depth 52 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55	Elevation and Datum 609.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock 28.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 5	Date Started 4/12/06
	Borehole Inclination -90	Logged by M. Angell/G. Maximov	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, sandy with gravel (ML); light yellowish gray, moist, stiff to very stiff, 30% sand and gravel. FILL	Begin 4/12/06	609
1												608
2												607
3												606
4		SPT 1	5 6 9	16.8/18						SILT sandy (ML), reddish brown (with light yellow streaks), moist, stiff, 30% sand, FILL		605
5												604
6												603
7												602
8											Classification based on B-1025-UD UD-2 from 8 to 10 ft	601
9		SPT 2	3 5 7	16.8/18	●					SILT sandy (ML) little to no gravel, light yellowish brown (10YR 6/4), moist, stiff, 2% gravel, 19% sand, 80% fines; FILL		600
10										SILT sandy (ML) At 9.4' color becomes yellowish brown (10YR 5/4).		599
11												598
12												597
13												596
14		SPT 3	4 5 7	15.6/18	●					SILT, sandy (ML) with minor gravel, light yellowish brown (10YR 6/4), moist, stiff. FILL		595
15												594
16												593
17												592
18												591
19		SPT 4	6 8 12	18					ML	SILT sandy (ML), greenish gray (10Y 6/1), moist, very stiff, 30% very fine sand. SAPROLITE		590
20												589
21												588
22												587
23												586
24		SPT 5	45 50/3.5	9.5					SM	SAND silty (SM), light gray (N 7), moist. PARTIALLY WEATHERED ROCK		585
25												584
26												583
27												582
28											Refusal at 28.5 ft, see rock log	581
29		SPT 6	60/1	0/1								580
30												579
31												578
32												577
33												576
34												575
35												574
36												573
37												572
38												571
39												570
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1025**	
Type and Diameter of Boring Wash Rotary / NQ core / 3.5 inch	Boring Location Unit 1 CT N 1165263 E 1845471		Total Depth 52 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55	Elevation and Datum 609.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock 28.5 feet
Casing Size and Depth none	Length of Core Barrel and Bit 5 feet	No. of Core Boxes 1	Date Started 4/12/06
	Borehole Inclination -90	Logged by M. Angell/G. Maximov	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
29–52	1	2.1/3.5	41	MW	R1		META-GRANODIORITE; light bluish gray (10B 7.5/1); medium grained, equigranular, foliation at ~45°	Begin NQ core	581–558
	2	3.2/5.0	50	MW	R1				
	3	3.8/5.0	50						
42–47	4	1.5/5.0	11	MW	R5		META QUARTZITE; light bluish gray (10B 7/1), microcrystalline, pitted		567–563
				SW	R3 to R4		METAGRANODIORITE; light bluish gray (10B 7/1), medium grained, equigranular		
48–49	5	4.6/5.0	90	SW to F	R4		SAA, migmatitic texture CONTINUOUS ROCK	End drilling 4/12/06 Begin drilling 4/13/06	562–561
50–52				F	R4 to R5		METADIORITE; bluish gray (5PB 5.5/1); medium grained, equigranular, very clear foliation at 30 to 40°	Coring terminated at 52 ft on 4/13/06	560–558

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389		**SOIL LOG - Boring No. B-1025-UD**	
Type and Diameter of Boring Wash Rotary / Tricone 3 inch	Boring Location Unit 1 CT N 1165268 E 1845470		Total Depth 21 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 4	Date Started 5/27/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/27/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 4 ft. Refer to B-1025 for log material descriptions and unit assignments	609
1												608
2												607
3												606
4												605
5		UD 1		20.4/24					ML	SILT (ML)	Shelby push 4 to 6 ft.	604
6												603
7											Drilled without sampling to 8 ft.	602
8												601
9		UD 2		22/24	●	●	●		ML	SILT sandy (ML); 2% gravel, 19% sand, 61% fines	Shelby push 8 to 10 ft.	600
10												599
11											Drilled without sampling to 12 ft	598
12												597
13		UD 3		25/24					ML	SILT (ML)	Shelby push 12 to 14 ft	596
14												595
15											Drilled without sampling to 20 ft.	594
16												593
17												592
18												591
19												590
20		UD 4		22.8/12	●	●	●		SP-SM	SAND silty (SP-SM); 7% gravel, 87% sand, 6% fines	Shelby push 20 to 21 ft Shelby tube refusal at 21 ft	589
21												588
22												587
23												586
24												585
25												584
26												583
27												582
28												581
29												580
30												579
31												578
32												577
33												576
34												575
35												574
36												573
37												572
38												571
39												570
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1026**	
Type and Diameter of Boring Hollow stem auger / 8 inch	Boring Location Unit 1 CT N 1164883 E 1845089		Total Depth 99.9 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 610.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Dry auger	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 20	Date Started 4/12/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML), strong brown, gravel covered with grass, FILL	Start drilling on 4/12/06	610–607
									ML	SILT, sandy (ML), brown (7.5YR 4/3), dry, very stiff fine sand, rock fragments, clayey fill deposits, non plastic trace roots. FILL		
4–5		SPT 1	6 9 11	18/18	●							606–605
9–10		SPT 2	7 9 12	18/18	●					SAA, red (2.5YR 4/6); 24% sand, 1% gravel, 75% fines. FILL	Classification based on B-1026-UD UD-1 at 9 to 11 ft	601–600
14–15		SPT 3	5 8 10	15/18	●	●				SAA, light brown (7.5YR 6/3) 26% sand, 4% gravel, 70% fines. FILL		596–595
19–20		SPT 4	10 12 19	12/18	●	●	●		SM	SAND silty with gravel (SM); 47% sand, 9% gravel, 44% fines. FILL		591–590
24–25		SPT 5	6 11 13	18/18	●							586–585
29–30		SPT 6	6 11 13	18/18	●							581–580
34–35		SPT 7	2 4 6	11/18	●				ML	SILT, sandy (ML), dark red (2.5YR 3/6), dry, stiff, low plasticity, trace rock fragments, trace roots. 28% sand, 73% fines. FILL	End day 4/12/06 Begin day 4/13/06, no water at 33.5 feet Classification based on B-1026-UD UD-3 at 34 to 36 ft Very hard drilling at 35.7 feet	576–575
36–38									ML	SILT, sandy (ML), strong brown (7.5YR 5/8), wet, stiff, micaceous, low plasticity. SAPROLITE		574–572
39–40		SPT 8	1 2 7	18/18	●							571

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1026

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40									ML			570
41												569
42												568
43												567
44		SPT 9	2 4 7	18/18	●					SILT, sandy (ML); 35% sand, 65% fines		566
45												565
46										SILT sandy (ML); 35% sand, 65% fines	Classification based on B-1026-UD UD-5 at 45 to 47 ft	564
47												563
48												562
49		SPT 10	2 4 6	18/18						SAA; nonplastic		561
50												560
51												559
52												558
53												557
54		SPT 11	3 6 10	18/18	●	●				SAA; very stiff, very micaeous; 42% sand, 58% fines. SAPROLITE		556
55												555
56												554
57												553
58												552
59		SPT 12	3 7 9	18/18								551
60												550
61												549
62												548
63												547
64		SPT 13	4 9 13	18/18	●	●				SILT, sandy (ML); 42% sand, 58% fines		546
65												545
66												544
67									▼			543
68												542
69		SPT 14	5 8 12	18/18	●					SILT, sandy (ML); strong brown with black (N 2.5) seams or veins, wet, very stiff, micaceous to very micaceous, nonplastic, 15% to 20 % fine sand. SAPROLITE		541
70												540
71												539
72												538
73									SM	SAND, silty (SM); strong brown with black; medium dense, 54% sand, 46% fines. SAPROLITE	Harder drilling at 72.2 feet	537
74		SPT 15	4 8 13	18/18	●	●						536
75												535
76												534
77												533
78												532
79		SPT 16	6 12 18	18/18	●					SAA; wet, non plastic, very micaceous		531
80												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1026

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80–83									SM			530–527
84–85		SPT 17	8 18 34	18/18	●	●			ML	SILT, sandy (ML); 48% sand, 52% fines		526–525
86–88									SM	SAND, silty (SM); yellowish brown (10YR 5/6) and dark olive gray (5Y 3/2), very dense, wet, fine sand <10% silt. SAPROLITE		524–522
89–90		SPT 18	27 31 36	18/18	●							521–520
91–93												519–517
94–95		SPT 19	14 26 34	18/18						SAA, brown (7.5YR 5/3) with pinkish white (7.5YR 8/2)		516–515
96–98												514–512
99		SPT 20	24 31 50/5	18/17								511
100									SM	SAND, silty (SM), brown (7.5YR 5/3), wet, very dense, micaceous, fine sand, <10% silt PARTIALLY WEATHERED ROCK	Boring terminated at 99.9 ft on 4/13/06; water at 67 ft	510
101–120										Total Depth 99.9 ft. Groundwater encountered at 67 feet Borehole Grouted On 4/17/06		509–491

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1026**	
Type and Diameter of Boring Hollow stem auger / 8 inch	Boring Location Unit 1 CT N 1164883 E 1845089		Total Depth 99.9 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 610.2 feet MSL	Ground Water Depth 67 feet	Depth to Bedrock N/A
Casing Size and Depth	Length of Core Barrel and Bit	No. of Core Boxes N/A	Date Started 4/12/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
100										510
101										509
102										508
103								Total Depth 99.9 ft.		507
104								Groundwater encountered at 67 feet		506
105								Borehole Grouted On 4/17/06		505
106										504
107										503
108										502
109										501
110										500
111										499
112										498
113										497
114										496
115										495
116										494
117										493
118										492
119										491
120										490
121										489
122										488
123										487
124										486
125										485
126										484
127										483
128										482
129										481
130										480
131										479
132										478
133										477
134										476
135										475
136										474
137										473
138										472
139										471

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1026-UD**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Unit 1 CT N 1164870 E 1845091		Total Depth 47 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 5	Date Started 5/28/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/28/06

Reviewed by / Date B. Reinicker 5/31/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 8 ft.Refer to B-1026 log for material description and unit assignments.	609
1												608
2												607
3												606
4												605
5												604
6												603
7												602
8												601
9											Shelby push 9 to 11 ft.	600
10		UD 1		21.6/24	●	●	●		ML	SILT, sandy (ML); 24% sand, 1% gravel, 75% fines		599
11											Drilled without sampling to 12 ft.	598
12											Shelby push 12 to 14 ft.	597
13		UD 2		18.5/24	●	●	●		ML	SILT, sandy (ML); 2% gravel, 23% sand, 76% fines		596
14											Drilled without sampling to 34 ft.	595
15												594
16												593
17												592
18												591
19												590
20												589
21												588
22												587
23												586
24												585
25												584
26												583
27												582
28												581
29												580
30												579
31												578
32												577
33												576
34											Shelby push 34 to 36 ft.	575
35		UD 3		27/24	●	●	●		ML	SILT, sandy (ML); 28% sand, 73% fines		574
36											Drilled without sampling to 40 ft.	573
37												572
38												571
39												570
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1026-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												
41		UD 4		27.25/24	●				ML	SILT (ML)	Shelby push 40 to 42 ft.	569
42												568
43											Drilled without sampling to 45 ft.	567
44												566
45												565
46		UD 5		27/24	●	●	●		ML	SILT, sandy (ML); 35% sand, 65% fines	Shelby push 45 to 47 ft. Boring terminated at 47 ft	564
47												563
48												562
49												561
50												560
51												559
52												558
53												557
54												556
55												555
56												554
57												553
58												552
59												551
60												550
61												549
62												548
63												547
64												546
65												545
66												544
67												543
68												542
69												541
70												540
71												539
72												538
73												537
74												536
75												535
76												534
77												533
78												532
79												531
80												530

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1027**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 1 CT N 1165384 E 1845448		Total Depth 50 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.7 feet MSL	Ground Water Depth 8 feet	Depth to Bedrock 31.6 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 4/13/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/14/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Grass over a gravel mat, sand with silt	Begin 4/13/06	609
1–3									ML	SILT sandy (ML), red (10R 4/6), rock fragment, non plastic. FILL		609–607
4–5		SPT 1	6 9 8	18/18								606–605
6–7												604–603
8									∇			602
9–10		SPT 2	4 7 8	15/18						SAA; yellowish red (5YR 4/6)		601–600
11–13												599–597
14–15		SPT 3	3 8 12	14/18						SAA		596–595
16–17												594–593
17–18									SM	SAND silty (SM), light bluish gray (10B 8/1) and (10B 7/1) with black (N 2.5) seams, fine sand, shows distinct rock texture, SAPROLITE/PARTIALLY WEATHERED ROCK	Very hard drilling at approximately 16.5 ft	592
19–20		SPT 4	25 50/6	12/12								591–590
21–22									SM	SAND gravely (SP), light bluish gray (10B 8/1), very dense, quartz gravel and sand, subangular fine to coarse sand. PARTIALLY WEATHERED ROCK		589–588
23–24		SPT 5	50/6	6/6							End 4/13/06 Start 4/14/06; water at 8 ft	587–586
25–28												585–582
29		SPT 6	50/4	4/4						Drill refusal, refer to rock log	Refusal at 28.8 ft, see rock log	581
30–40												580–570

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1027**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 1 CT N 1165384 E 1845448		Total Depth 50 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.7 feet MSL	Ground Water Depth 8 feet	Depth to Bedrock 31.6 feet
Casing Size and Depth 3 inch / 13 feet	Length of Core Barrel and Bit 13.1 feet	No. of Core Boxes 2	Date Started 4/13/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/14/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
7	2.7/5.0	0	CW	R0 to R1		SAND, gravelly (SP), light bluish gray (10B 8/1), very dense, quartz gravel and sand, subangular fine to coarse sand. PARTIALLY WEATHERED ROCK	Begin NQ rock coring
			HW	R3		QUARTZITE; light bluish gray (5PB 7/1); pyrite and dendritic manganese oxide formation along fracture surfaces.	
			CW	R1			
8	4.2/4.6	41	MW	R2		META-GRANODIORITE; light bluish gray; foliation dipping 35 to 60°; very thinly laminated	
			MW to SW	R3 to R4		Quartz dike at 36.3 to 37.3 ft.	
			MW	R3			
9	4.0/4.0	56	MW	R3			
10	1.6/1.6	37	MW	R3			
11	3.7/6.0	51	MW	R3		META-GRANODIORITE to SCHIST; light bluish gray; fine to medium grained; strongly foliated. (40 to 60° dip) Dissolution pits and iron oxide stains throughout sample.	Losing ~50% water
							Coring terminated at 50 ft on 4/14/06

Total Depth 50 ft.
Groundwater encountered at 8 feet
Borehole Grouted On 4/14/06

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1028**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Unit 2 CT N 1166140 E 1848027		Total Depth 103.55 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 609.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 21	Date Started 3/7/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 3/8/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML		Begin drilling 3/7/06 Fill	609–607
4–5		SPT 1	3 3 5	18/18	●	●				SILT sandy with gravel (ML), yellowish red (5YR 5/6), damp, medium stiff, 56% fines, 37% sand, 7% gravel. FILL		606–605
9–10		SPT 2	3 3 6	14/18	●					SILT sandy (ML), reddish brown (5YR 4/4), damp, stiff ~15% sand. FILL		601–600
14–15		SPT 3	7 7 9	10/18	●	●	●			SILT sandy with gravel (ML), yellowish red (5YR 4/6), very stiff; 36% sand; 3% gravel, 61% fines; FILL		596–595
18											Hard bouncing drilling	592
19–20		SPT 4	5 10 13	18/18	●					SILT sandy (ML), red to strong brown (2.5YR 4/8 to 7.5YR 5/6), damp, very stiff, ~30% sand, fine sand. FILL		591–590
24–25		SPT 5	5 6 9	15/18	●					SILT sandy (ML), red (2.5YR 4/8), damp, stiff to very stiff, fine to coarse sand,1% gravel, 32% sand, 67% fines. FILL	Classification based on B-1028-UD, UD-2 at 24 to 26 ft	586–585
29–30		SPT 6	13 11 10	0/18						NO SAMPLE RECOVERED		581–580
34–35		SPT 7	8 11 15	6/18	●	●				SILT sandy (ML), red (2.5YR 5/6), damp, very stiff, 35% sand, 65% fines, slightly sticky, slightly plastic. FILL		576–575
38											Classification based on B-1028-UD, UD-3 at 39 to 41 ft	572
39–40		SPT 8	4 7 8	17/18	●					SILT sandy (ML), red (2.5YR 4/8) 43% sand, 57% fines. FILL		571–570

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1028

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40											End of day 3/7/06 Begin drilling on 3/8/06	
41												569
42												568
43												567
44		SPT 9	5 8 9	14/18	●					SILT, sandy (ML); reddish brown (5YR 4/4), damp, stiff to very stiff, >30% sand. FILL		566
45												565
46												564
47												563
48												562
49		SPT 10	6 7 10	17/18	●	●				SILT sandy (ML), light olive brown (2.5Y 5/3), damp, very stiff, 30% sand, 70% fines. FILL		561
50												560
51												559
52												558
53												557
54		SPT 11	6 11 10	15/18	●					SILT sandy, clayey (ML), red (2.5YR 4/6), damp, very stiff, ~30% sand, minor clay. FILL		556
55												555
56												554
57												553
58												552
59		SPT 12	7 10 13	15/18	●	●				SILT, sandy (ML); red (2.5YR 4/6); very stiff; 33% sand; 2% gravel, 65% fines. FILL		551
60												550
61												549
62												548
63												547
64		SPT 13	5 9 12	18/18	●					SILT sandy (ML), red (10R 4/6), damp, very stiff, ~20% sand, fine sand, FILL		546
65												545
66												544
67									ML	SILT sandy, clayey (ML), light greenish gray (5G 8/1), damp, medium stiff, 36% sand, 64% fines, ALLUVIUUM		543
68												542
69		SPT 14	8 7 8	16/18	●	●						541
70												540
71												539
72												538
73											Switched from roller cone to wing bit	537
74		SPT 15	4 30 11	9.5/18	●					SILT clayey with sand (ML), light greenish gray (5G 8/1) to brownish yellow (10YR 6/8), damp, hard, ~30% sand. ALLUVIUUM		536
75												535
76									SM	SAND silty (SM), light brownish gray (10YR 6/2), moist, loose, 54% sand, 47% fines. RESIDUUM		534
77												533
78											Classification based on B-1028-UD, UD-6 at 79 to 81 ft	532
79		SPT 16	2 3 5	18/18	●							531
80												530

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1028

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80									SM			529
81												528
82												527
83												526
84		SPT 17	7 11 12	18/18	●					SAA, pale brown (10YR 6/3); very stiff. RESIDUUM		525
85												524
86												523
87												522
88												521
89		SPT 18	6 8 14	9.5/18	●					SAA; pale yellow (2.5Y 7/4); moist; very stiff; ~30% sand. RESIDUUM		520
90												519
91												518
92												517
93												516
94		SPT 19	3 4 9	15/18	●				SM	SAND, silty (SM); yellow (10YR 8/8), moist, medium dense, fine to medium sand. SAPROLITE 58% sand, 42% fines	Classification based on B-1028-UD, UD-7 at 94 to 94.6 ft	515
95												514
96												513
97												512
98												511
99		SPT 20	19 50/2	7/8	●	●			SM	SAND silty (SM), yellow (2.5Y 7/8), moist, 62% sand, 35% fines; 3% gravel; PARTIALLY WEATHERED ROCK		510
100												509
101												508
102												507
103		SPT 21	50/0.5	0/0.5						NO SAMPLE RECOVERED. PARTIALLY WEATHERED ROCK.	Boring terminated on 3/8/06 at 103.55 ft	506
104												505
105												504
106												503
107												502
108												501
109												500
110												499
111												498
112												497
113												496
114												495
115												494
116												493
117												492
118												491
119												490
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1028-UD**	
Type and Diameter of Boring Wash Rotary / 4 inch	Boring Location Unit 2 CT N 1166150 E 1848024		Total Depth 94.6 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 609.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 7	Date Started 6/8/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/9/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Offset 8.5 ft from B-1028. Begin 6/8/06	609
1											Drilled without sampling to 4 ft. Refer to B-1028 log for material descriptions and unit assignments.	608
2												607
3												606
4											Shelby push 4 to 6.3 ft.	605
5		UD 1		27.6 / 26.75					ML	SILT, sandy (ML)		604
6												603
7											Drilled without sampling to 24 ft.	602
8												601
9												600
10												599
11												598
12												597
13												596
14												595
15												594
16												593
17												592
18												591
19												590
20												589
21												588
22												587
23												586
24											Shelby push 24 to 26 ft	585
25		UD 2		18.6 / 24	●	●	●		ML	SILT, sandy (ML); 1% gravel, 32% sand, 68% fines		584
26											Drilled without sampling to 39 ft.	583
27											End 6/8/06	582
28											Start 6/9/06	581
29												580
30												579
31												578
32												577
33												576
34												575
35												574
36												573
37												572
38												571
39		UD		25						Description provided on following page.	Shelby push 39 to 41.1 ft	570
40												

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1028-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		3		25	●	●	●		ML	SILT, sandy (ML); 43% sand, 57% fines		
41												569
42											Drilled without sampling to 64 ft	568
43												567
44												566
45												565
46												564
47												563
48												562
49												561
50												560
51												559
52												558
53												557
54												556
55												555
56												554
57												553
58												552
59												551
60												550
61												549
62												548
63												547
64												546
65		UD 4		22.2/24					ML	SILT, sandy (ML)	Shelby push 64 to 66 ft	545
66												544
67											Drilled without sampling to 69 ft.	543
68												542
69												541
70		UD 5		24.6/24					ML	SILT, sandy, clayey (ML)	Shelby push 69 to 71 ft	540
71												539
72											Drilled without sampling to 79 ft	538
73												537
74												536
75												535
76												534
77												533
78												532
79		UD		26.4						Description provided on following page.	Shelby push 79 to 81 ft.	531
80												530

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1028-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80		6		24	●	●	●		SM	SAND, silty (SM); 47% fines, 54% sand		
81											Drilled without sampling to 94 ft.	529
82												528
83												527
84												526
85												525
86												524
87												523
88												522
89												521
90												520
91												519
92												518
93												517
94		UD		7	●	●	●		SM	SAND, silty (SM) 42% fines, 58% sand	Shelby push 94 to 94.6 ft	516
95		7		7							Shelby push refusal, boring terminated on 6/9/06	515
96												514
97												513
98												512
99												511
100												510
101												509
102												508
103												507
104												506
105												505
106												504
107												503
108												502
109												501
110												500
111												499
112												498
113												497
114												496
115												495
116												494
117												493
118												492
119												491
120												490

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1029**	
Type and Diameter of Boring Hollow stem auger / 8 inch	Boring Location Unit 2 CT N 1165581 E 1848117		Total Depth 99.25 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.8 feet MSL	Ground Water Depth 49.3 feet	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 20	Date Started 4/11/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/12/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									GP ML	GRAVEL (GP) with grass	Begin 4/11/06	609–607
4–5		SPT 1	23 11 8	3/18						SILT sandy (ML), red (2.5YR 4/6), dry, very stiff, fine to medium sand, fine gravel, low to non plastic. FILL		606–605
9–10		SPT 2	3 6 9	3/18						SAA		601–600
14–15		SPT 3	1 5 8	14/18	●	●				SAA; 30% sand, 2% gravel, 68% fines. FILL		596–595
19–20		SPT 4	4 8 13	16/18						SAA; clayey fill deposits. FILL		591–590
24–25		SPT 5	2 8 10	12/18	●	●				SAA; 34% sand; 1% gravel, 65% fines. FILL		586–585
29–30		SPT 6	3 5 9	18/18						SILT sandy (ML), strong brown (7.5YR 5/6), dry, fine sand, non plastic. FILL		581–580
34–35		SPT 7	3 6 10	15/18	●	●				SAA; 32% sand, 68% fines. FILL		576–575
39–40		SPT 8	11 12 17	2/18								571–570

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1029

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												569
41												568
42												567
43												566
44	/	SPT 9	9 11 15	18/18								565
45												564
46												563
47												562
48												561
49	/	SPT 10	5 13 14	18/18	●	●			▽	SILT, sandy with clay (ML), red (10R 4/8), dry, very stiff, 39% sand, 61% fines, quartzite fragments. FILL		560
50												559
51												558
52												557
53												556
54	/	SPT 11	4 6 9	18/18					ML	SILT, sandy (ML), light red (2.5YR 6/6) damp, very stiff, mottled, micaceous, fine to medium sand. RESIDUUM		555
55												554
56												553
57												552
58												551
59	/	SPT 12	3 9 11	18/18	●	●				SAA; moist; 46% sand, 54% fines	Groundwater first encountered during drilling at 59 ft	550
60												549
61												548
62												547
63												546
64	/	SPT 13	7 13 17	18/18						SAA; wet, hard, laminated banding		545
65												544
66												543
67												542
68												541
69	/	SPT 14	9 13 14	16/18	●	●				SAA; yellow (10YR 7/6), very pale brown (10YR 7/4), wet, coarse quartz fragments, very stiff; 40% sand, 60% fines. FILL		540
70												539
71												538
72												537
73												536
74	/	SPT 15	3 9 13	18/18						SAA; very dark brown veins, wet, fine to coarse subrounded sand. FILL		535
75												534
76												533
77												532
78												531
79	/	SPT 16	4 10 15	18/18								530
80												

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1029

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80												529
81												528
82												527
83												526
84		SPT 17	5 12 18	14/18							End 4/11//06 Begin 4/12/06; water at 49.3 ft	525
85											Stiffer drilling	524
86												523
87												522
88												521
89		SPT 18	14 19 26	17/18					SM	SAND, silty (SM), brownish yellow (10YR 6/8) and very pale brown (10YR 8/3); wet, dense, <10% silt, fine to medium sand, micaceous. SAPROLITE		520
90												519
91												518
92									SM	SAND, silty (SM); mottled, very pale brown (10YR 8/3), brownish yellow (10YR 6/8), and very dark brown (10YR 2/2); wet, very dense, fine to medium sand, micaceous, PARTIALLY WEATHERED ROCK	Very hard drilling Partially weathered rock	517
93												516
94		SPT 19	32 50/6	9/12								515
95												514
96												513
97												512
98												511
99		SPT 20	45 50/3	9/9						SAND silty (SM) PARTIALLY WEATHERED ROCK/SAPROLITE	Boring terminated on 4/12/06	510
100												509
101												508
102										Total Depth 99.25 ft. Groundwater encountered at 49.3 feet Borehole Grouted On 4/12/06		507
103												506
104												505
105												504
106												503
107												502
108												501
109												500
110												499
111												498
112												497
113												496
114												495
115												494
116												493
117												492
118												491
119												490
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1030**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Unit 2 CT N 1165963 E 1848403		Total Depth 98.8 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 609.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 20	Date Started 4/11/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/12/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT slightly sandy, clayey (ML); yellowish-red (5YR 4/6), damp, stiff, low plasticity, micaceous. FILL	Begin 4/11/06	609–607
4–5	✓	SPT 1	4 5 7	18/18								606–605
6–8												604–602
9–10	✓	SPT 2	4 24 16	8.4/18	●	●			SM	SAND, silty with gravel (SM); mottled, yellowish-red (5YR 4/6) and reddish-yellow (5YR 7/8), damp, dense, non-plastic with large angular gravel 9.5 ft, micaceous; 21% gravel, 41% sand, 38% fines. FILL		601–600
11–13												599–597
14–15	✓	SPT 3	4 6 7	12/18					ML	SILT, sandy (ML) trace clay, reddish-brown (2.5YR 4/4); moist, damp, stiff, non-plastic, small sub-angular gravel, micaceous. FILL		596–595
16–18												594–592
19–20	✓	SPT 4	5 8 9	7.2/18	●	●				SILT (ML), low to non-plasticity, micaceous; 3% gravel, 43% sand, 54% fines. FILL		591–590
21–23												589–587
24–25	✓	SPT 5	5 6 9	18/18						SAA, red (2.5YR 4/6); slight increase in clay content, low plasticity, micaceous. FILL		586–585
26–28												584–582
29–30	✓	SPT 6	5 6 6	14.4/18						SILT slightly sandy, clayey (ML) strong brown (7.5YR 5/6), moist, stiff, low-plasticity, abundant small weathered gravels, micaceous. FILL		581–580
31–33												579–577
34–35	✓	SPT 7	4 6 8	15.6/18	●	●				SILT sandy with gravel (ML) trace clay, primarily red (2.5YR 4/6) with various other weathered colors staining, moist, stiff, no to low plasticity except in some lenses of greater clay content with low to mid plasticity, micaceous; 2% gravel, 30% sand, 68% fines. FILL		576–575
36–38												574–572
39–40	✓	SPT 8	4 13 11	14.4/18						SAA, only becoming very stiff at 38.2 ft. FILL		571–570

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1030

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												569
41												568
42												567
43												566
44	/	SPT 9	6 9 12	15.6/18	●	●				SILT sandy, clayey (ML) reddish brown (5YR 4/4); moist, very stiff, non-plastic, micaceous, 40% sand, 60% fines. FILL		565
45												564
46												563
47												562
48												561
49	/	SPT 10	5 8 12	15.6/18						SAA		560
50												559
51												558
52												557
53												556
54	/	SPT 11	5 7 10	15.6/18	●	●				SILT, sandy, trace clay (ML) reddish-brown (5YR 4/4); moist, very stiff, low to non-plastic, micaceous; 40% sand, 1% gravel, 59% fines. FILL		555
55												554
56												553
57												552
58												551
59	/	SPT 12	9 13 17	18/18						SILT, slightly sandy, clayey (ML); yellowish-red (5YR 4/6), damp, very stiff, low to medium plasticity, micaceous. FILL		550
60												549
61												548
62												547
63												546
64	/	SPT 13	3 6 6	18/18					ML	SILT, slightly sandy, clayey (ML); mottled, red (2.5YR 4/8) and reddish-yellow (7.5YR 6/6), damp to moist, stiff, low-plasticity. RESIDUUM		545
65											End 4/11/06	544
66											Start 4/12/06	543
67												542
68												541
69	/	SPT 14	2 3 4	18/18					ML	SILT (ML), yellowish-brown (10YR 5/6), moist to wet, medium stiff, non-plastic, micaceous, manganese oxide and iron oxide staining. SAPROLITE		540
70												539
71												538
72												537
73												536
74	/	SPT 15	2 2 4	18/18						SAA, mottled appearance due to manganese oxide and iron oxide staining.		535
75												534
76												533
77												532
78												531
79	/	SPT 16	2 3 4	18/18						SAA; dark yellowish-brown (10YR 4/6).		530
80												

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1030

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80									ML			529
81												528
82												527
83												526
84		SPT 17	4 4 5	18/18						SAA; olive brown (2.5YR 4/4), trace clay, very micaceous. SAPROLITE		525
85												524
86												523
87												522
88												521
89		SPT 18	3 5 8	16.8/18						SAA; light brownish-gray (2.5YR 6/2) from 88.5 to 89.5 ft, then to olive-yellow (2.5YR 6/6), stiff, SAPROLITE		520
90												519
91												518
92												517
93												516
94		SPT 19	19 34 50	18/18					SP-SM	SAND, silty (SP/SM), light gray (2.5YR 7/1), damp to moist, very dense, manganese-oxide staining and quartz in thin fracture. PARTIALLY WEATHERED ROCK		515
95												514
96												513
97												512
98												511
99		SPT 20	50/3	3/3						SAA, PARTIALLY WEATHERED ROCK	SPT refusal, boring terminated on 4/12/06	510
100												509
101												508
102												507
103												506
104												505
105												504
106												503
107												502
108												501
109												500
110												499
111												498
112												497
113												496
114												495
115												494
116												493
117												492
118												491
119												490
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1031**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Switchyard N 1164731 E 1847445		Total Depth 38.8 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 604 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 8	Date Started 3/3/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/3/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									GM	GRAVEL with fines for 8 inches	Begin drilling 3/3/06	604
1									ML	SILT, sandy (ML); red (2.5YR 4/6), damp, stiff, micaceous, non-plastic. FILL		603
2												602
3												601
4		SPT 1	5 5 8	13.2/18								600
5												599
6												598
7												597
8												596
9		SPT 2	4 8 10	13.2/18	●	●				SILT, sandy (ML); red (2.5YR 4/6), very stiff with trace clay; 32% sand; 1% gravel, 67% fines. FILL		595
10												594
11												593
12												592
13												591
14		SPT 3	4 7 9	18/18	●				SM	SAND, silty (SM); yellowish brown (10YR 5/4); damp, medium dense, micaceous, quartzite fragments. FILL		590
15												589
16												588
17												587
18												586
19		SPT 4	5 6 7	18/18	●				ML	SILT, sandy (ML); yellowish brown (10YR 5/4); damp, stiff, micaceous, quartzite fragments. SAPROLITE		585
20												584
21												583
22												582
23												581
24		SPT 5	2 3 4	18/18	●					SILT, sandy (ML); very pale brown (10YR 7/3); moist, medium stiff; 44% sand, 56% fines, mottled, micaceous. SAPROLITE	Classification based on B-1031-UDA UD-2 at 24 to 26 ft	580
25												579
26												578
27												577
28												576
29		SPT 6	2 4 50/4	16/16								575
30									SM	SAND, silty (SM); dark grayish brown (10YR 4/2); moist, very dense, micaceous. PARTIALLY WEATHERED ROCK		574
31												573
32												572
33												571
34		SPT 7	40 50/4	12/10						SAND, silty (SM); pale brown (10YR 6/3); moist very dense micaceous. PARTIALLY WEATHERED ROCK		570
35												569
36												568
37												567
38												566
39		SPT 8	50/3	3/3						SAA; very dark grayish brown (10YR 3/2)	Boring terminated 3/3/06	565
40												564

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1031-UD**	
Type and Diameter of Boring Wash Rotary / 4 inch nominal	Boring Location Switchyard N 1164740 E 1847445		Total Depth 16 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 604 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 5/29/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/29/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 4 ft.	604
1												603
2												602
3												601
4									ML	SILT, sandy (ML).	Shelby push 4 to 6 ft.	600
5		UD 1		27.75/24								599
6									ML	SILT, sandy (ML).	Drilled without sampling to 14 ft.	598
7												597
8												596
9												595
10												594
11												593
12												592
13												591
14												590
15		UD 2		0/24						No recovery.	Shelby push 14 to 16 ft. No recovery. Boring terminated on 5/29/06.	589
16												588
17												587
18												586
19												585
20												584
21												583
22												582
23												581
24												580
25												579
26												578
27												577
28												576
29												575
30												574
31												573
32												572
33												571
34												570
35												569
36												568
37												567
38												566
39												565
40												564

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1031-UDA**	
Type and Diameter of Boring Wash Rotary / 4 inch nominal	Boring Location Switchyard N 1164728 E 1847439		Total Depth 37 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 603.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 6	Date Started 6/7/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/8/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Offset 11.4 ft from B-1031 UD Drilled without sampling to14 ft.	603
1												602
2												601
3												600
4												599
5												598
6												597
7												596
8												595
9												594
10												593
11												592
12												591
13												590
14											Shelby push 14 to 16 ft.	589
15		UD 1		19.2/24					SM	SAND, silty (SM).		588
16											Drilled without sampling to 24 ft.	587
17												586
18												585
19												584
20												583
21												582
22												581
23												580
24											Shelby push 24 to 26 ft	579
25		UD 2		22.8/24	●	●	●		ML	SILT, sandy (ML); 44% sand, 56% fines.		578
26											Drilled without sampling to 27 ft.	577
27		UD 3		0/24						No Recovery.	End 6/7/06 Start 6/8/06 Water was near the surface	576
28												575
29		UD 4		0/24						No Recovery.	Shelby push 27 to 29 ft, no recovery	574
30											Shelby push 29 to 31 ft No recovery	573
31		UD 5		12/12					SM	SAND, silty (SM).	Shelby push 31 to 32 ft. Shelby tube refusal at 32.0 ft	572
32												571
33												570
34												569
35		UD 6		10.8/24					SM	SAND, silty (SM).	Pitcher barrel sample 35 to 37 ft; softer zone of pitcher drilling 35.4 to 36.6 ft	568
36											Boring terminated 6/8/06	567
37												566
38												565
39												564
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1032**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Switchyard N 1164553 E 1846696		Total Depth 40.2 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 603.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 8	Date Started 3/4/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 3/4/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, (ML); yellowish brown (10YR 4/8) to olive brown (2.5Y 4/4); damp, medium stiff, <15% sand, non-plastic. FILL	Begin drilling 3/4/06	603
1												602
2												601
3												
4		SPT 1	2 4 5	18/18								600
5												599
6												598
7												597
8												596
9		SPT 2	4 6 8	18/18						SAA; brownish yellow (10YR 6/8). FILL		595
10												594
11												593
12									ML	SILT, sandy (ML)' brown (10YR 5/3); damp to moist, hard, ~20 to 25% sand, non-plastic. SAPROLITE		592
13												591
14		SPT 3	10 16 21	15/18								590
15												589
16												588
17												587
18												586
19		SPT 4	25 37 50	18/18						SILT, sandy (ML); brown (10YR 5/3); damp, hard, >30% sand, fine to coarse sand. SAPROLITE		585
20												584
21												583
22									ML	SILT, sandy (ML) with minor gravel; brown to dark brown (10YR 4/3); damp to moist, hard, coarse to very coarse sand, fine gravel, gravel are lithic fragments of unweathered rock. PARTIALLY WEATHERED ROCK		582
23												581
24		SPT 5	30 50/5	9/11								580
25												579
26												578
27												577
28												576
29		SPT 6	8 10 25	13/18						SILT, sandy (ML) with minor gravel; brown to dark brown (10YR 4/3); damp to moist, >30% sand, fine gravel, hard. PARTIALLY WEATHERED ROCK		575
30												574
31												573
32												572
33												571
34		SPT 7	20 20 26	12/18						SILT, sandy (ML); brown (10YR 5/3); damp, hard ~30% sand, fine sands, minor fine gravel (from weathering of lithic fragments). PARTIALLY WEATHERED ROCK		570
35												569
36												568
37												567
38												566
39		SPT 8	50/3	4/3						SILT, sandy (ML); strong brown (7.5YR 5/6); damp, hard, ~>30% sand, medium to coarse sand, minor		565
40												564

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1032

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		SPT 9	50/2	4/2						fine gravel. PARTIALLY WEATHERED ROCK SAA, yellowish brown (10YR 5/6). PARTIALLY WEATHERED ROCK	Boring terminated on 3/4/06	563
41												562
42												561
43												560
44												559
45												558
46												557
47												556
48												555
49												554
50												553
51												552
52												551
53												550
54												549
55												548
56												547
57												546
58												545
59												544
60												543
61												542
62												541
63												540
64												539
65												538
66												537
67												536
68												535
69												534
70												533
71												532
72												531
73												530
74												529
75												528
76												527
77												526
78												525
79												524
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1033**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Switchyard N 1164557 E 1847059		Total Depth 40.5 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 604.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 10	Date Started 3/5/06
	Borehole Inclination -90	Logged by R. Ortiz	Date Completed 3/5/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Begin drilling 3/5/06	604
1												603
2												602
3												601
4		SPT 1	6 8 8	8/18	●							600
5									ML	SILT, sandy (ML); red (2.5YR 4/8); damp, medium stiff, fine sand, poorly graded. FILL		599
6												598
7												597
8												596
9		SPT 2	5 6 7	18/18	●					SILT, sandy, clayey (ML); red (2.5YR 4/6); damp, stiff, fine sand, poorly graded, 57% fines. FILL	Classification based on B-1033-UD UD-2 at 10 to 12 ft	595
10												594
11												593
12												592
13												591
14		SPT 3	4 6 8	15/18	●	●				SILT, sandy, clayey (ML); red (2.5YR 4/8), damp, stiff grades into a SILT with sand (ML) yellowish red (5YR 4/6), poorly graded; 36% sand, 64% fines. FILL		590
15												589
16												588
17												587
18												586
19		SPT 4	4 6 8	16/18	●					SILT, sandy (ML); red, (10YR 4/6); damp, stiff, ~25% sand. FILL		585
20												584
21												583
22									ML	SILT, sandy (ML); gray (7.5YR 6/10) to yellow brown (10YR 5/4); damp, hard >30% sand, fine sand, large quartz clast (~1.0 inch). SAPROLITE		582
23												581
24		SPT 5	11 20 38	18/18	●						Rocky drilling	580
25												579
26												578
27												577
28												576
29		SPT 6	7 20 16	18	●					SILT, sandy (ML); light brownish gray (2.5YR 6/2); hard, >30% sand, fine sand, large pieces of quartz. SAPROLITE	Rocky drilling, bouncing rig	575
30												574
31									ML	SILT, sandy (ML) with minor gravel; yellowish brown (10YR 5/6); damp, >30% sand, gravel due to the breakdown of lithic fragments, poorly graded. PARTIALLY WEATHERED ROCK		573
32												572
33												571
34		SPT 7	48 50/5	12/11								570
35												569
36												568
37												567
38												566
39		SPT 8	41 50/4	12/10						SAA, brown to dark brown (10YR 4/3).		565
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1033

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		SPT 50/6		6/6						SAA, yellowish brown (10YR 5/6). PARTIALLY WEATHERED ROCK.	Boring terminated on 3/5/06	564
41												563
42												562
43												561
44												560
45												559
46												558
47												557
48												556
49												555
50												554
51												553
52												552
53												551
54												550
55												549
56												548
57												547
58												546
59												545
60												544
61												543
62												542
63												541
64												540
65												539
66												538
67												537
68												536
69												535
70												534
71												533
72												532
73												531
74												530
75												529
76												528
77												527
78												526
79												525
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1033-UD**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location Switchyard N 1164563 E 1847059		Total Depth 28 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 604.1 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 4	Date Started 6/8/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/8/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 4 ft.	604
1												603
2												602
3												601
4												600
5		UD 1		19.2/24					ML	SILT, sandy (ML).	Shelby push from 4 to 6 ft	599
6												598
7											Drilled without sampling to 10 ft.	597
8												596
9												595
10												594
11		UD 2		24/24	●	●	●		ML	SILT, sandy (ML); 43% sand, 57% fines.	Shelby push from 10 to 12 ft	593
12												592
13											Drilled without sampling to 22 ft.	591
14												590
15												589
16												588
17												587
18												586
19												585
20												584
21												583
22												582
23		UD 3		7.2/24					ML	SILT, sandy (ML).	Pitcher drill from 22 to 24 ft	581
24												580
25											Drilled without sampling to 26 ft.	579
26											Pitcher drill from 26 to 28 ft	578
27		UD 4		19.2/24					ML	SILT, sandy (ML).		577
28											Boring terminated on 6/8/06	576
29												575
30												574
31												573
32												572
33												571
34												570
35												569
36												568
37												567
38												566
39												565
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1034**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Switchyard N 1164327 E 1847522		Total Depth 39.3 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 604 feet MSL	Ground Water Depth 17.47 feet	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 3/5/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/6/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, sandy (ML); yellowish brown (10YR 5/8) to red (10R 4/8); damp, very stiff, <10% sand and clay, poorly graded. SAPROLITE	Begin drilling 3/5/06	604
1												603
2												602
3												601
4		SPT 1	9 7 9	18/18								600
5												599
6												598
7												597
8												596
9		SPT 2	6 9 9	16/18						SILT, sandy (ML); brown (10YR 5/3); damp, very stiff, <10% sand (fine), poorly graded, <10% clay. SAPROLITE		595
10												594
11												593
12												592
13												591
14		SPT 3	3 3 4	17/18						SILT, sandy (ML); yellow (10YR 7/8) to yellowish brown (10YR 5/4); damp, stiff, 10-15% fine sand, <10% clay, poorly graded. SAPROLITE		590
15												589
16												588
17									▽			587
18												586
19		SPT 4	3 3 5	16/18						SILT, sandy (ML); brown (10YR 5/3); damp, stiff, <30% fine sand, <10% clay. SAPROLITE		585
20												584
21												583
22												582
23												581
24		SPT 5	5 10 10	18/18						SILT, sandy (ML); white (5Y 8/1) to light yellowish brown (2.5YR 6/4); very stiff, damp ~30% fine sand <10% clay. SAPROLITE		580
25												579
26												578
27												577
28												576
29		SPT 6	14 50/4	12/10					ML	SILT, sandy (ML); very pale brown (10YR 7/3); damp, >30% sand, fine to medium grained, poorly to moderately graded. PARTIALLY WEATHERED ROCK		575
30										PARTIALLY WEATHERED ROCK		574
31										No samples recovered		573
32												572
33												571
34		SPT 7	50/1	0/1							End of day 3/5/06 Begin day 3/6/06	570
35		CORE		0/12							Rock cored 34 to 35 ft, no recovery, return to SPT sampling	569
36												568
37												567
38												566
39		SPT 8	50/0.25 50/0	0/0.25							Boring terminated 3/6/06 39.3 ft	565
40												564

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1034

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		SPT 9		0 0								564
41												563
42										Total Depth 39.3 ft.		562
43										Groundwater encountered at 17.47 feet		561
44										Borehole Grouted On 3/6/06		560
45												559
46												558
47												557
48												556
49												555
50												554
51												553
52												552
53												551
54												550
55												549
56												548
57												547
58												546
59												545
60												544
61												543
62												542
63												541
64												540
65												539
66												538
67												537
68												536
69												535
70												534
71												533
72												532
73												531
74												530
75												529
76												528
77												527
78												526
79												525
80												524

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1035**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Switchyard N 1164164 E 1847146		Total Depth 40.2 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 604.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 3/6/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/7/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Begin drilling on 3/6/06	604
1												603
2												602
3												601
4		SPT 1	3 3 4	13/18						SILT, sandy (ML); light yellowish brown (2.5Y 6/4); damp, medium stiff, <10% sand (very fine), and clay. RESIDUUM		600
5												599
6												598
7												597
8												596
9		SPT 2	3 3 4	15/18						SILT, sandy (ML); yellowish brown (10YR 5/4); damp, medium stiff, <10 % sand or clay, poorly graded. RESIDUUM		595
10												594
11												593
12												592
13												591
14		SPT 3	6 9 12	13/18						SILT, sandy (ML); dark yellowish brown (10YR 5/6); damp, very stiff >30 % sand (well sorted, fine) >10% clay, poorly graded. RESIDUUM		590
15												589
16												588
17												587
18												586
19		SPT 4	18 30 46	16/18						SILT, sandy, clayey (ML); olive brown (2.5Y 4/4); damp, hard, < 20% very fine sand, < 10% clay. RESIDUUM		585
20												584
21												583
22												582
23												581
24		SPT 5	50/1	1/1					ML	SILT, (ML); dark olive gray (5Y 3/2); micaceous. PARTIALLY WEATHERED ROCK		580
25												579
26												578
27												577
28												576
29		SPT 6	49 50/3	11/9					ML	SILT, clayey, sandy and rock fragments, brown (10YR 4/3) to dark grayish brown (10YR 4/2); damp, <15 % clay. PARTIALLY WEATHERED ROCK		575
30												574
31												573
32												572
33												571
34		SPT 7	50/3	6/3						SILT, sandy (ML); dark yellowish brown (10YR 3/4); damp, <15% sand (fine) <10% clay. PARTIALLY WEATHERED ROCK	End drilling 3/6/06 Begin drilling 3/7/06	570
35												569
36												568
37												567
38												566
39		SPT 8	36 50/5.5	12/11.5						SILT, sandy (ML); grayish brown (2.5Y 5/2); ~25% sand, fine sand, poorly graded. PARTIALLY		565
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1035

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		SPT 9	50/2	4/2						WEATHERED ROCK SAA, olive brown (2.5YR 4/3)	Boring terminated 3/7/06 at 40.2 ft	564
41												563
42												562
43												561
44												560
45												559
46												558
47												557
48												556
49												555
50												554
51												553
52												552
53												551
54												550
55												549
56												548
57												547
58												546
59												545
60												544
61												543
62												542
63												541
64												540
65												539
66												538
67												537
68												536
69												535
70												534
71												533
72												532
73												531
74												530
75												529
76												528
77												527
78												526
79												525
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1036**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Low flow reservoir dam N 1166863 E 1844076		Total Depth 23.5 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 591.1 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 4	Date Started 6/5/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/6/06

Reviewed by / Date B. Reinicker 6/14/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									GP	Surface vegetation root mat (~0.2 ft)	Begin drilling 6/5/06	591
1									ML	Gravel mat (~0.1 ft)		590
2										SILT, sandy (ML); strong brown (7.5YR 5/6); dry; very stiff; <20% sand; fine to medium grained; <5% fine gravel; nonplastic; FILL		589
3												588
4		SPT 1	4 8 8	18/18								587
5												586
6												585
7												584
8												583
9		SPT 2	4 8 12	18/18						SAA; micaceous; lifts of fine grained gravel		582
10												581
11												580
12											Losing water	579
13												578
14		SPT 3	9 13 16	18/18						SAA; damp, very stiff; <20% sand; fine to medium grained; <5% fine gravel; non to low plasticity; FILL	End 6/5/06 Start 6/6/06; no water	577
15												576
16											Hole caving, little to no water return	575
17												574
18												573
19		SPT 4	0 6 11	18/18						SAA; strong brown; (7.5 YR 5/6); damp to moist; <20% sand, <5% gravel, red clayey lifts; fine to medium sand, <5% roots, low to non plastic; FILL	Overdrilled by 6 inches	572
20												571
21												570
22												569
23												568
24											Boring terminated due to no water recirculation	567
25												566
26												565
27												564
28												563
29												562
30												561
31												560
32												559
33												558
34												557
35												556
36												555
37												554
38												553
39												552
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1037**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location East side excavation pit N 1166205 E 1847506		Total Depth 78.75 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55	Elevation and Datum 589.3 feet MSL	Ground Water Depth 17.5 feet	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 16	Date Started 3/29/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Begin drilling 3/29/06	589
1												588
2												587
3												586
4		SPT 1	5 7 8	13/18						SILT, sandy, (ML); mottled red (10R 5/6) to brownish yellow (10YR 6/6), mottled, damp, stiff, medium plastic, poorly graded. Fragments of SAPROLITE (relict rock texture evident), sand is fine grained. FILL		585
5												584
6												583
7												582
8												581
9		SPT 2	5 7 9	14/18						SILT, sandy (ML) strong brown (7.5YR 5/6) and olive gray (5Y 5/2) at tip of shoe SAPROLITE (as above), very stiff, sand, <20 % fine grained. FILL		580
10												579
11												578
12												577
13												576
14		SPT 3	3 3 5	13/18	●	●				SILT, sandy with clay (ML); variegated strong brown and olive gray; medium stiff to stiff; 34% sand 66% fines. FILL		575
15												574
16												573
17									▽			572
18												571
19		SPT 4	3 3 4	13/18	●				ML	SILT, sandy (ML); dark yellowish brown (10YR 4/4) to green-gray grayish brown (2.5Y 5/2), medium stiff, damp, layers (~2 inch) of clay, 41% sand, 2% gravel, 57% fines. SAPROLITE		570
20											Classification based on B-1037-UD UD-2 at 19 to 21 ft	569
21												568
22									SM	SAND, silty (SM); yellow (2.5Y 7/6); moist, loose, fine to medium SAND, relict rock texture throughout, some red laminations clay (0.5 cm). SAPROLITE		567
23												566
24		SPT 5	3 3 2	14/18	●							565
25												564
26												563
27												562
28												561
29		SPT 6	2 2 4	16/18	●					SAND, silty (SM); white (2.5Y 8/0 to 2.5Y 5/2); moist, loose, fine grained SAND, to medium SAND, mica-rich, poorly graded, low plasticity, 5% gravel, 47% sand, 48% fines. SAPROLITE	Classification based on B-1037-UD UD-4 at 29 to 31 ft	560
30												559
31												558
32												557
33												556
34		SPT 7	2 3 3	17/18	●					SAND, silty (SM); loose. Some red clay layers medium black Manganese layers (<1 cm) also parallel foliation. SAPROLITE		555
35												554
36												553
37												552
38												551
39		SPT 8	4 5 7	12/18	●	●				SAND, silty (SM); olive gray (5Y 4/2) to white and grayish brown (2.5Y 8/1 to 2.5Y 5/2), damp,		550
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1037

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										medium dense, fine grained, 53% SAND,, 47% fines. SAPROLITE	Boring abandoned due to squeezing of sidewall. Move hole to continue	549
41										SAND, silty (SM); yellow (2.5Y 7/6); moist, loose, fine to medium SAND, relict rock texture throughout, some red laminations clay (0.5 cm). SAPROLITE		548
42												547
43									ML	*(Continued from previous page)*		546
44		SPT 9	3 3 6	17/18						SILT, sandy (ML); olive gray (5Y 4/2) to white and grayish brown (2.5Y 8/1 to 2.5Y 5/2); 48% sand, 52% fines. SAPROLITE	Classification based on B-1037-UD UD-6 at 43 to 45 ft	545
45												544
46												543
47												542
48												541
49		SPT 10	5 8 10	15/18	●	●				SILT, sandy (ML); yellow and brownish yellow (10YR 7/6 to 10YR 6/6), damp, very stiff, 45% sand, 55% fines. SAPROLITE		540
50												539
51												538
52												537
53											Losing about 70% water at 53 ft	536
54		SPT 11	7 8 10	16/18						SILT, sandy (ML); brownish yellow (10YR 6/6), very stiff, sand, is fine to medium grained; SAPROLITE		535
55												534
56												533
57												532
58												531
59		SPT 12	5 6 10	16/18						SILT, sandy (ML) to SILT, clayey (ML) yellow and white (2.5Y 7/6 to 2.5Y 8/2) to brownish yellow (10YR 6/6) to olive brown (2.5Y 4/4), very stiff, damp, 50% SAND, 50% fines. SAPROLITE	Classification based on B-1037-UD UD-8 at 59 to 61 ft	530
60												529
61												528
62												527
63												526
64		SPT 13	8 9 13	15/18	●	●			SM	SAND, silty (SM), brownish yellow (10YR 6/6), damp, medium dense, 45% fines, 55% SAND, is fine to medium grained. SAPROLITE		525
65												524
66												523
67												522
68												521
69		SPT 14	14 29 43	15/18						SAND, silty (SM); sand has slightly increased coarser component, damp, very dense, moderately graded. SAPROLITE		520
70												519
71												518
72									SM	SAND, silty (SM); brownish yellow (10YR 6/6); SAND, fine to coarse grained. PARTIALLY WEATHERED ROCK		517
73												516
74		SPT 15	50/2	2/2								515
75											Drill grinding and crunching	514
76												513
77												512
78										No recovery.	Boring terminated, refer to B-1037A located for offset boring 10 ft north from	511
79		SPT 16	50/1.5	1.5/1.5								510
80												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1037

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80											B-1037	509
81												508
82										Total Depth 78.75 ft.		507
83										Groundwater encountered at 17.5 feet		506
84										Borehole Grouted On 4/26/06		505
85												504
86												503
87												502
88												501
89												500
90												499
91												498
92												497
93												496
94												495
95												494
96												493
97												492
98												491
99												490
100												489
101												488
102												487
103												486
104												485
105												484
106												483
107												482
108												481
109												480
110												479
111												478
112												477
113												476
114												475
115												474
116												473
117												472
118												471
119												470
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1037-UD**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location General N 1166209 E 1847500		Total Depth 68 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 589.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 9	Date Started 6/9/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/10/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Boring located NW of B-1037 Drilled without sampling to 13 ft.	589
1												588
2												587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10												579
11												578
12												577
13											Shelby push 13 to 15 ft	576
14		UD 1		21.6/24					ML	SILT, sandy (ML).		575
15											Drilled without sampling to 19 ft.	574
16												573
17												572
18												571
19									ML	SILT, sandy (ML); 2% gravel, 41% sand, 57% fines.	Shelby push 19 to 21 ft	570
20		UD 2		19.2/24	●	●	●					569
21											Drilled without sampling to 23 ft.	568
22												567
23											Shelby push 23 to 25 ft	566
24		UD 3		24/24					SM	SAND, silty (SM).		565
25											Drilled without sampling to 29 ft.	564
26												563
27												562
28												561
29											Shelby push 29 to 31 ft	560
30		UD 4		22.8/24	●	●	●		SM	SAND, silty (SM); 5% gravel, 47% sand, 48% fines.		559
31											Drilled without sampling to 33 ft.	558
32												557
33											Shelby push 33 to 35 ft	556
34		UD 5		24/24					SM	SAND, silty (SM).		555
35											Drilled without sampling to 43 ft.	554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1037-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												549
41												548
42												547
43											Shelby push 43 to 45 ft	546
44		UD 6		24/24	●	●	●		ML	SILT, sandy (ML); 48% sand, 52% fines.		545
45											Drilled without sampling to 53 ft.	544
46												543
47												542
48												541
49												540
50												539
51												538
52												537
53											Shelby push 53 to 55 ft	536
54		UD 7		24/24					ML	SILT, sandy (ML).		535
55											Drilled without sampling to 59 ft.	534
56												533
57												532
58												531
59											Shelby push 59 to 61 ft.	530
60		UD 8		24/24	●	●	●		ML	SILT, sandy (ML); 50% sand, 50% fines.		529
61												528
62												527
63											Pitcher barrel 63 to 65 ft	526
64		UD 9		14.4/24					ML	SILT, sandy (ML).		525
65												524
66												523
67												522
68											Tricone refusal. Boring terminated	521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1037A**	
Type and Diameter of Boring HQ core / 3.75 inch	Boring Location East side excavation pit N 1166215 E 1847504		Total Depth 96.6 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 589.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock 70.6 feet
Sampling Method No sampling	Sample Driving Hammer/Drop NA / NA	No. of Samples 0	Date Started 4/2/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 4/4/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drill without sampling, offset 10 ft north from boring B-1037 for downhole geophysical measurements	Start 4/2/06	589
1												588
2												587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10												579
11												578
12												577
13												576
14												575
15												574
16												573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33									▽			556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1037A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										Drill without sampling, offset 10 ft north from boring B-1037 for downhole geophysical measurements *(Continued from previous page)*		549
41												548
42												547
43												546
44												545
45												544
46												543
47												542
48												541
49												540
50												539
51												538
52												537
53												536
54												535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69										Refer to rock log.		520
70											End of day 4/2/06; water ~40 ft set PVC casing Begin 4/3/06; begin core drilling	519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1037A**	
Type and Diameter of Boring HQ core / 3.75 inch	Boring Location East side excavation pit N 1166215 E 1847504		Total Depth 96.6 feet
Drilling Contractor and Rig MACTEC/White/33115 / CME 55 LC	Elevation and Datum 589.3 feet MSL	Ground Water Depth 33 feet	Depth to Bedrock 70.6 feet
Casing Size and Depth 4 inch / 70.6 feet	Length of Core Barrel and Bit 8.6 feet / 8.6 feet	No. of Core Boxes 3	Date Started 4/2/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 4/4/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
71	1	1.0/1.0	70	MW	R3		META-GRANODIORITE; mottled white (7.5YR 8/1); reddish yellow (7.5YR 8/6) and black (7.5YR 2/1); porphyroblastic, fine to coarse grained, reddish yellow oxides along fracture surfaces, healed fractures dip 50°, vugs/pits along healed incipient fractures; very closely spaced irregular incipient healed fractures.		518
72–76	2	3.3/5.0	32	MW	R2 to R3				517–513
77–80	3	5.0/5.0	90	MW	R2 to R3		SAA; increasing xenoliths of leucocratic to mafic composition CONTINUOUS ROCK		512–509
81							META-QUARTZ DIORITE		508
82							META-GRANODIORITE		507
83–86	4	5.0/5.0	100	F	R4 to R5		META-QUARTZ DIORITE; pegmatitic dikes (feldspar-rich) with calcite veins and quartz veins, and very closely to closely spaced incipient and healed fractures and foliation joints.		506–504
87–91	5	5.0/5.0	100	F	R4 to R5		META-GRANODIORITE; xenoblastic, fine to coarse grained; mafics >40%, feldspar 30 to 40%, quartz 20 to 30%.		503–499
92–96	6	4.9/5.0	98	F	R5		SAA; slightly mafic mineral composition near 94 ft Migmatitic texture highly mafic zone.	End of day 4/3/06 Begin day 4/4/06 water level 33 ft	498–493
97–110							Total Depth 96.6 ft. Groundwater encountered at 33 feet Borehole Grouted On 4/26/06	End of coring	492–479

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1038**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch / NQ	Boring Location Unit 2 N 1166165 E 1847350		Total Depth 50.2 feet
Drilling Contractor and Rig MACTEC/Abingdon / CME 75	Elevation and Datum 546.5 feet MSL	Ground Water Depth 1 feet	Depth to Bedrock 4.1 feet
Casing Size and Depth none	Length of Core Barrel and Bit 13.1 feet	No. of Core Boxes 3	Date Started 5/29/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/31/06

Reviewed by / Date B. Reinicker 10/6/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
4–5		1	2.2/2.2	67	MW to SW	R3		Wash rotary refusal at 4.1 ft. META-GRANODIORITE; bluish gray (5PB 6/1); black (N 2.5); light red (2.5YR 6/8); fine to medium grained; quartz, plagioclase, K-spar, hornblende, iron and manganese staining on some joint surfaces; micaceous minerals	Gravel fill to 4.1 ft for use as drill pad	542–541
6–7		2	1.6/1.6	100	MW to SW	R3				540
8		3	0.2	100	MW to SW	R3		Little to no iron staining	End day 5/29/06 Start 5/30/06; water at 1 ft - area requires pumping to access drill rig.	539
		4	0.2	100		R3				538
9		5	0.8	57	MW to SW	R3		CONTINUOUS ROCK		537
10		6	0.8 0.4	89	MW to SW	R3				536
11			0.7		MW to SW					535
12		7	1.8 1.8	100	MW to SW	R3				534
13			2.3							533
14		8	2.3	100	MW to SW	R3				532
15		9	0.5 0.5	100	MW to SW	R3				531
16–17			4.3/4.3							530–529
18–19		10	5.0/5.0	100	F	R4		SAA; calcite in healed very closely spaced veins; mafic inclusion (~4 cm x 2 cm)		528–527
20–21										526–525
22–23										524–523
24–25		11	5.0/5.0	95	F	R4				522–521
26–27										520–519
28–29		12	5.0/5.0	100	F	R4				518–517
30–31										516–515
32–33										514
34–35		13	5.2/5.2	95	F	R4		META-GRANODIORITE		513–512
36–37										511–510
38–39		14	2.0/2.0	100	F	R4				509–508
40–41								META-GRANODIORITE		507–506
42–43		15	4.1/4.1	100	F	R4				505–504–503

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1038

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
44										502
45								SAA; epidote and calcite mineralization within some healed fractures	End day 5/30/06 Start 5/31/06; water measured 1.0 ft - area requires pumping to access drill rig.	501
46										500
47		16	5.9/5.9	98	F	R4				499
48										498
49										497
50									Boring terminated on 5/31/06	496
51										495
52										494
53								Total Depth 50.2 ft. Groundwater encountered at 1 feet Borehole Grouted On 1/19/07		493
54										492
55										491
56										490
57										489
58										488
59										487
60										486
61										485
62										484
63										483
64										482
65										481
66										480
67										479
68										478
69										477
70										476
71										475
72										474
73										473
74										472
75										471
76										470
77										469
78										468
79										467
80										466
81										465
82										464
83										463

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1044**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch / NQ	Boring Location ISFSI N 1167711 E 1847455		Total Depth 43.6 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588 feet MSL	Ground Water Depth N/A	Depth to Bedrock 23.6 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 5/1/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SP-SM	Field straw grass root mat (3 inches thick)		588
1										SAND silty (SP to SM)		587
2										Light bluish gray (5PB 7/1),dense to very dense		586
3										<5% silt, fine to coarse sand, SAPROLITE		585
4		SPT 1	8 19 17	18								584
5												583
6												582
7												581
8												580
9		SPT 2	13 21 25	18/18								579
10												578
11												577
12												576
13											Refusal at 13.6 ft., see rock log	575
14		SPT 3	50/1	2/1						SAA; SAPROLITE.		574
15												573
16												572
17												571
18												570
19												569
20												568
21												567
22												566
23												565
24												564
25												563
26												562
27												561
28												560
29												559
30												558
31												557
32												556
33												555
34												554
35												553
36												552
37												551
38												550
39												549
40												548

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1044**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch / NQ	Boring Location ISFSI N 1167711 E 1847455		Total Depth 43.6 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588 feet MSL	Ground Water Depth N/A	Depth to Bedrock 23.6 feet
Casing Size and Depth 3.75 inch / 13.6 feet	Length of Core Barrel and Bit 13.1 feet	No. of Core Boxes 3	Date Started 5/1/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
14		4	4.3/5.0	36	HW	R2 to R3		Weathered mafic minerals such as hornblende, replaced with biotite, meta quartzite and muscovite.	SPT refusal at 13.6 feet Beginning NQ Rock core	574
15										573
16										572
17										571
18								Quartz vein with mineralization of biotite		570
19		5	5.0/5.0	44	MW	R3				569
20								Vugs manganese rich staining		568
21										567
22					HW	R2		Biotite mineralization around the quartz vein		566
23					MW	R3				565
24		6	5.0/5.0	66				META-GRANODIORITE to META-QUARTZ DIORITE; bluish gray (10PB 5/1); fine grained, felsic banding moderately spaced, thin and medium thick altered plagioclase or K-spar near subvertical closely spaced fractures. CONTINUOUS ROCK		564
25										563
26					HW	R2				562
27										561
28								Quartzite pegmatite vein (27.6 to 27.9)		560
29		7	4.8/5.0	96						559
30										558
31										557
32										556
33										555
34		8	5.0/5.0	100	SW to F	R3		META-QUARTZ DIORITE to META-GRANODIORITE; fine to medium grained, moderately spaced fractures, primary minerals quartz, hornblende, K-spar, biotite, muscovite.		554
35										553
36										552
37								Red aphanitic mineralization		551
38										550
39		9	5.0/5.0	100				Mafic xenoliths with calcite healed fractures		549
40										548
41										547
42										546
43								Mafic xenoliths.		545
44									Over drilled ~5 inch to ensure final depth and mechanical break near end of run	544
45										543
46										542
47										541
48										540
49										539
50										538
51										537
52										536
53										535

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1045**	
Type and Diameter of Boring Wash Rotary / NQ2 core / 3 inch / NQ	Boring Location ISFSI N 1167756 E 1847636		Total Depth 54 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock 21 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 11	Date Started 4/24/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	Field straw grass root mat SILT, sandy (ML) red (10R 5/6); >10% fine sand, low plasticity, clayey fill deposits, fine gravel. FILL	Begin drilling 4/24/06	588
1												587
2												586
3												585
4		SPT 1	3 3 6	10/18	●					SAA; 5% gravel, 52% fines, 43% sand. FILL	End 4/24/06 Start 4/25/06 No water encountered Classification based on B-1045-UD, UD-1 at 4 to 6 ft	584
5												583
6												582
7												581
8												580
9		SPT 2	3 7 12	15/18	●					SAA, red (10R 5/6); more dry, 41% sand, 59% fines. FILL	Classification based on B-1045-UD, UD-2 at 9 to 10.2 ft	579
10												578
11												577
12									ML	SILT, sandy (ML); red (10R 5/6) reddish brown (5YR 4/4), white (5YR 8/1); medium dense, fine to medium sand, trace quartz rock fragments. RESIDUUM SAA; 48% sand, 52% fines		576
13												575
14		SPT 3	15 11 7	18							Classification based on B-1045-UD UD-3 at 14 to 16 ft	574
15												573
16												572
17												571
18												570
19		SPT 4	3 50/4	9/7					SM	SAND, silty (SM); pinkish gray (7.5YR 7/2); and brown (7.5YR 5/3); fine to medium sand, very dense, <10% silt, subangular, plagioclase and quartz rock fragments. SAPROLITE		569
20												568
21											End 4/25/06. No water encountered Start 4/30/06. No water encountered Tricone refusal at 21.0 ft, see rock log	567
22												566
23												565
24												564
25												563
26												562
27												561
28												560
29												559
30												558
31												557
32												556
33												555
34												554
35												553
36												552
37												551
38												550
39												549
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1045**	
Type and Diameter of Boring Wash Rotary / NQ2 core / 3 inch / NQ	Boring Location ISFSI N 1167756 E 1847636		Total Depth 54 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock 21 feet
Casing Size and Depth none	Length of Core Barrel and Bit 13.1 feet	No. of Core Boxes 3	Date Started 4/24/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	Lithology	Remarks
5	2.4/3.0	30	HW to MW	R2 to R3	META-QUARTZ DIORITE; bluish gray (5PB 6/1) to light bluish gray (5PB 7/1); fine to medium grained; hornblende, biotite, plagioclase, quartz. PARTIALLY WEATHERED ROCK	Begin rock core at 21.0 ft on 5/1/06 Did not use casing
			HW	R2		
6	4.7/5.0	88	MW		META-QUARTZ DIORITE; bluish gray (5PB 6/1) to light bluish gray (5PB 7/1); fine to medium grained. CONTINUOUS ROCK	100% water recirculation loss
7	5.0/5.0	100	SW to F	R3	META-QUARTZ DIORITE; healed breccia filled with biotite or hornblende.	
8	5.0/5.0	100				
9	4.8/5.0	88			META-QUARTZ DIORITE; bluish gray (5PB 6/1); fine to medium grained; plagioclase, quartz, hornblende, calcite, epidote, chlorite; subvertical epidote healed fractures Altered plagioclase near closely spaced healed fractures.	
			CW	R2	Chlorite and meta-quartzite healed fracture, weathered with manganese oxide stained vugs.	
10	4.9/5.0	98	SW to F	R3	Fine grained zone from 45.1 to ~ 46.5 ft.	
11	4.5/5.0	88			SAA; fine to medium grained; mafic xenoliths.	
						Last 0.5 ft of core left in hole Boring terminated on 5/1/06
					Total Depth 54 ft. Borehole Grouted On 5/1/06	

Depth (feet) / Elevation (feet)

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1045-UD**	
Type and Diameter of Boring Wash Rotary / 4 inch	Boring Location ISFSI N 1167749 E 1847628		Total Depth 16 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 588.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 3	Date Started 6/11/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/11/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 4 ft.	588
1												587
2												586
3												585
4											Shelby push 4 to 6 ft	584
5		UD 1		20.4/24	●	●	●		ML	SILT, sandy (ML); 5% gravel, 43% sand, 52% fines.		583
6											Drilled without sampling to 9 ft.	582
7												581
8												580
9											Shelby push 9 to 10.2 ft Shelby push refusal at 10.2 ft	579
10		UD 2		14.4/14.4	●	●	●		ML	SILT, sandy (ML); 41% sand, 59% fines.		578
11											Drilled without sampling to 14 ft.	577
12												576
13												575
14											Shelby push 14 to 16 ft	574
15		UD 3		18/24	●	●	●		ML	SILT, sandy (ML); 48% sand, 52% fines.		573
16											Boring terminated	572
17												571
18												570
19												569
20												568
21												567
22												566
23												565
24												564
25												563
26												562
27												561
28												560
29												559
30												558
31												557
32												556
33												555
34												554
35												553
36												552
37												551
38												550
39												549
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1046**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch / NQ	Boring Location ISFSI N 1167815 E 1847834		Total Depth 93.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588.3 feet MSL	Ground Water Depth 36 feet	Depth to Bedrock 61.4 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 12	Date Started 4/18/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/24/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Grassmat 0.3 feet		588
1–3									ML	SILT, sandy (ML) red (2.5YR 4/6); stiff; clayey (fill) deposits, fine gravel; fine sand; 39% sand, 61% fines. FILL	Begin drilling 4/18/06	587–586
4–5		SPT 1	8 7 7	18	●	●					Very hard drilling	585–584
6–8												583–580
9–10		SPT 2	3 4 6	18/18	●					SILT, sandy (ML); light red (2.5YR 6/8); stiff; <10% sand; trace clayey fill deposits; scattered rock fragments. FILL		579–578
11–13												577–575
14–15		SPT 3	3 6 5	11/18	●					SAA; non to low plastic silts; quartz gravel pieces in first 6 inch 12% gravel, 36% sand, 53% fines. FILL	Classification based on B-1046-UD, UD-3 at 14 to 16 ft	574–573
16–17												572
18											Stiff drilling at 17.0 feet	571
19–20		SPT 4	4 6 7	14/18	●				SM	SAND silty (SM) red (2.5YR 4/8), dry, fine sand, medium dense; <15% silt, sparse and scattered rock fragments, FILL		570–569
21–23												568–566
24–25		SPT 5	3 5 6	13/18	●				ML	SILT, sandy (ML) Light red (2.5YR 6/8), dry to damp, stiff, fine sand non to low plasticity; 25% sand, 74% fines. RESIDUUM	Classification based on B-1046-UD, UD-5 at 24 to 26 ft Harder drilling at ~ 25.5 feet	565–564
26–28												563–561
29–30		SPT 6	4 6 8	15/18						SAA; micaceous.		560–559
31–33												558–556
34–35		SPT 7	3 4 7	17/18	●				SM ▽	SAND, silty (SM), reddish yellow (5YR 6/6) medium dense, <30% silt, fine sand, quartz fragments, poorly graded. RESIDUUM		555–554
36–38												553–550
39–40		SPT 8	4 4 6	18/18	●				CL	CLAY, sandy (CL), red (10R 4/6); trace sand		549

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1046

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40–43									SM	medium plasticity. RESIDUUM SAND, silty (SM); reddish yellow (5YR 6/6); loose, ~15% silt, fine sand, quartz fragments. RESIDUUM *(Continued from previous page)*		548–545
44–45		SPT 9	5 12 20	18/18					ML	SILT, sandy (ML); reddish yellow (5YR 6/6); hard, 44% sand, 56% fines. RESIDUUM	Classification based on B-1046-UD UD-8 44 to 46 ft	544–543
46–48												542–540
49–50		SPT 10	15 22 37	15/18						SAA; hard, fine to medium sand, coarse component appears to be quartz or plagioclase. RESIDUUM		539–538
51–53												537–535
54–55		SPT 11	27 39 46	17/18	●					SAA; reddish yellow (5YR 6/6); hard, fine to medium sand. RESIDUUM		534–531
56–58									SM	SAND, silty (SM); reddish yellow (5YR 6/6); fine to medium sand.		533–530
59–60		SPT 12	50/1	1						SAPROLITE/PARTIALLY WEATHERED ROCK		529–528
61–80												527–509

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1046**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch / NQ	Boring Location ISFSI N 1167815 E 1847834		Total Depth 93.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 588.3 feet MSL	Ground Water Depth 36 feet	Depth to Bedrock 61.4 feet
Casing Size and Depth 3.5 inch / 58.6 feet	Length of Core Barrel and Bit 13.1 feet / 13.1 feet	No. of Core Boxes 3	Date Started 4/18/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/24/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
13	2.4/4.7	0	RS to CW	R0 to R2		SAND, (SP); yellowish red (5YR 5/6); quartz vein. PARTIALLY WEATHERED ROCK	End SPT sampling at 58.6 feet; SPT refusal. Begin NQ rock core. See core log.
			HW to MW	R3		META-GRANODIORITE, bluish gray (10B 6/1), fine to medium grained, joints are moderately open with very thin manganese staining. Quartz is the chief accessory mineral. PARTIALLY WEATHERED ROCK.	
			HW	R2			
14	4.0/4.0	38	MW	R3			
			HW	R0			
15	6.0/6.0	95	MW to SW	R3		SAA,mafic xenoliths, epidote filling in some healed fractures.	Lost 100% water ~70 ft
16	5.0/5.0	58				SAA; PARTIALLY WEATHERED ROCK	
				R2			
17	4.9/5.0	88				META-DIORITE, dark bluish gray (5B 4/1) and dark brown (7.5YR 3/3), fine grained, foliation dipping 50°, calcite filled fractures with accessory minerals biotite or hornblende. CONTINUOUS ROCK.	End 4/18/06 Start 4/19/06 water at 38.0 feet
						META-DIORITE, black (N 2.5), fine grained, calcite filled fractures with accessory minerals hornblende and biotite.	
18	5.0/5.0	76	SW to F	R3		META-GRANODIORITE, light bluish gray, fine to medium grained, having accessory mineralization of calcite, biotite, quartz, plagioclase.	
19	4.7/5.0	82				META-GRANODIORITE, bluish gray, (10B 6/1) fine to medium grained, biotite, quartz, plagioclase, calcite mineralization.	End 4/19/06 Start 4/24/06 water at 36.0 feet
							Coring terminated 4/24/06

Total Depth 93.3 ft.
Groundwater encountered at 36 feet
Borehole Grouted On 4/24/06

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1046-UD**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location ISFSI N 1167822 E 1847835		Total Depth 54 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 588 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 9	Date Started 6/10/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/11/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											6/10/06 Drilled without sampling to 4 ft.	588
1												587
2												586
3												585
4		UD 1		0/3						No recovery.	Shelby push 4 to 4.25 ft Shelby push refusal No recovery Drilled without sampling to 10 ft.	584
5												583
6												582
7												581
8												580
9												579
10		UD 2		23.4/24					ML	SILT, sandy (ML).	Shelby push 10 to 12 ft.	578
11												577
12											Drilled without sampling to 14 ft.	576
13												575
14		UD 3		15.6/24	●	●	●		ML	SILT, sandy (ML); 12% gravel, 36% sand, 52% fines	Shelby push 14 to 16 ft	574
15												573
16											Drilled without sampling to 19 ft.	572
17												571
18												570
19		UD 4		23.4/24					SM	SAND, silty (SM).	Shelby push 19 to 21 ft.	569
20												568
21											Drilled without sampling to 24 ft.	567
22												566
23												565
24		UD 5		22.8/24	●	●	●		ML	SILT, sandy (ML); 25% sand, 74% fines.	Shelby push 24 to 26 ft.	564
25												563
26											Drilled without sampling to 32 ft.	562
27												561
28												560
29												559
30												558
31												557
32		UD 6		16.2/24					SM	SAND, silty (SM).	Shelby push 32 to 34 ft End 6/10/06 Start 6/11/06 Groundwater not available Drilled without sampling to 40 ft.	556
33												555
34												554
35												553
36												552
37												551
38												550
39												549
40												548

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1046-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												548
41		UD 7		27.6/28					SM	SAND, silty (SM).	Shelby push 40 to 42.3 ft.	547
42												546
43											Drilled without sampling to 44 ft.	545
44											Changed over to pitcher barrel equipment	544
45		UD 8		19.2/24	●	●	●		ML	SILT, sandy (ML); 44% sand, 56% fines.	Pitcher drill from 44 to 46 ft.	543
46												542
47											Drilled without sampling to 52 ft.	541
48												540
49												539
50												538
51												537
52												536
53		UD 9		8.4/24					SM	SAND, silty (SM).	Pitcher drill 52 to 54 ft.	535
54											Boring terminated 6/11/06	534
55												533
56												532
57												531
58												530
59												529
60												528
61												527
62												526
63												525
64												524
65												523
66												522
67												521
68												520
69												519
70												518
71												517
72												516
73												515
74												514
75												513
76												512
77												511
78												510
79												509
80												508

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1047**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch / NQ	Boring Location ISFSI N 1167543 E 1847907		Total Depth 93.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 588.1 feet MSL	Ground Water Depth 32 feet	Depth to Bedrock 58.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 11	Date Started 4/25/06
	Borehole Inclination -90	Logged by A. Tillery/E. Weldon	Date Completed 4/27/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									SM	SAND, silty (SM), yellow (10YR 7/8), damp, loose and yellow with quartz grain, mottled with dark black manganese and white spots. RESIDUUM	Begin drilling 4/25/06	588–585
4–5	✓	SPT 1	4 2 3	18/18								584–583
6–8												582–580
9–10	✓	SPT 2	3 3 4	16/18	●	●				SAND, silty (SM), yellow (10YR 7/8); damp, loose, mottled; large zone of black mineral manganese near top of sample; 43% fines, 57% sand.		579–578
11–13												577–575
14–15	✓	SPT 3	4 5 8	17/18	●	●				SAND, silty (SM); much less yellow (2.5YR 5/3); damp, medium dense, more gray, white and black, still mottled, biotite quartz and fewer black inclusions; 42% fines, 58% sand. RESIDUUM		574–573
16–18												572–570
19–20	✓	SPT 4	5 8 10	13/18	●				SM	SAND, silty (SM); gray upper 6 inches (10YR 7/2); damp, medium dense, bottom half (below 6 inches) more yellow (10YR 7/6). SAPROLITE		569–568
21–23												567–565
24–25	✓	SPT 5	6 7 10	16/18	●	●				SAA, yellow (10YR 7/6); damp, medium dense, mottled yellow, gray, some black manganese oxide, 49% fines, 51% sand. SAPROLITE		564–563
26–28												562–560
29	✓	SPT 6	5 12 26	15/18						SAA; yellow (10YR 6/6); damp; hard; mottled		559
30–33									SM	SAND, silty (SM); yellow, gray and some black; PARTIALLY WEATHERED ROCK ▽		558–555
34–35	✓	SPT 7	34 46 50/5	16/17	●	●				SAND, silty (SM); yellow gray (10YR 6/4); damp, very dense, mica, quartz, less black manganese oxide, 39% fines, 61% sand. PARTIALLY WEATHERED ROCK		554–553
36–38												552–550
39–40	✓	SPT 8	32 50/6	12/12						SAA, gray (2.5Y 7/2); damp, mottled. PARTIALLY WEATHERED ROCK		549

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1047

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
44		SPT 9	50/2	4/2						SAND, silty (SM); yellow (2.5Y 6/8); damp, some gravel sized rock fragments. PARTIALLY WEATHERED ROCK		544
49		SPT 10	50/4	6/4						SAND, silty (SM); yellow (10YR 5/8); damp, quartz fragments up to 0.5 cm, mottled. PARTIALLY WEATHERED ROCK		539
54		SPT 11	36 50/4	11/10	●	●				SAND, silty (SM) (2.5Y 6/3); 37% fines, 63% sand. PARTIALLY WEATHERED ROCK		534
58										No recovery.	SPT sampling terminated 58.5 ft. See rock log	530
59		SPT 12	50/1	0/1								529

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1047**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch / NQ	Boring Location ISFSI N 1167543 E 1847907		Total Depth 93.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 588.1 feet MSL	Ground Water Depth 32 feet	Depth to Bedrock 58.5 feet
Casing Size and Depth 3.5 inch / 58.5 feet	Length of Core Barrel and Bit 5 feet / 3 feet	No. of Core Boxes 2	Date Started 4/25/06
	Borehole Inclination -90	Logged by A. Tillery/E. Weldon	Date Completed 4/27/06

Reviewed by / Date F. Syms 5/22/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
59–63		1	4.4/5.0	37	MW	R1 to R2		META-GRANODIORITE; gray to black to light orange; equigranular texture to moderately coarse grained. Weak foliation shown by mineral alignment and compositional segregation. Foliation direction varies from horizontal to 35°. Many healed fractures, brecciated in places, closely spaced with rough some vugs and pits weathered out.	End 4/25/06 Begin 4/26/06; water at 27.2 ft	529–525
64–68		2	5.0/5.0	50	MW	R1 to R2		Fractures healed with calcite Meta-mafic dike or amphibolite from 67.8 to 69 ft		524–520
69–71		3	5.0/5.0	68	MW to SW	R2 to R3		META-GRANODIORITE as above. CONTINUOUS ROCK. Meta-mafic dike or amphibolite from 70.6 to 71.4 ft		519–517
72–78		4	5.0/5.0	68	MW to SW	R2 to R3		META-QUARTZ DIORITE to META-GRANODIORITE light color mineral lining fractures, minerals albite, quartz, feldspar, mafics, minor calcite, talc, and epidote.		516–510
79		5	0.5 0.5	0	MW to SW	R2 to R3				509
80–81		6	2.5/2.5	68	MW to SW	R2 to R3				508–507
82–83		7	1.6/2.0	37	MW to SW	R2 to R3				506–505
84–87		8	4.3/5.0	68	SW	R3		AMPHIBOLITE; dark bluish gray (5B 4/1); very fine grained; foliation dip 60°, xenoliths of meta-quartz diorite/meta-granodiorite.		504–501
88–93		9	4.8/5.0	90	F	R4		META-QUARTZ DIORITE to META-GRANODIORITE as described above	End 4/26/06 Begin 4/27/06; water at 32 ft Losing water	500–495
94–98								Total Depth 93.5 ft. Groundwater encountered at 32 feet Borehole Grouted On 4/27/06	Boring terminated 4/27/06	494–490

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1047-UD**	
Type and Diameter of Boring Wash Rotary / 6 inch	Boring Location ISFSI N 1167548 E 1847908		Total Depth 40 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 588.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 5	Date Started 6/11/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/11/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											6/11/06 Drilled without sampling to 4 ft.	588
1												587
2												586
3												585
4											Shelby push 4 to 6 ft	584
5		UD 1		23.4/24					ML	SILT, sandy (ML).		583
6											Drilled without sampling to 9 ft.	582
7												581
8												580
9											Shelby push 9 to 11.1 ft	579
10		UD 2		25/25					ML	SILT, sandy (ML).		578
11											Drilled without sampling to 14 ft.	577
12												576
13												575
14											Shelby push 14 to 16 ft.	574
15		UD 3		22.8/24	●	●	●		SM	SAND, silty (SM); 35% fines, 65% sand.		573
16											Drilled without sampling to 24 ft.	572
17												571
18												570
19												569
20												568
21												567
22												566
23												565
24											Shelby push 24 to 25.6 ft.	564
25		UD 4		15.6/19.2	●	●	●		ML	SILT, sandy (ML); 1% gravel, 47% sand, 52% fines.	Shelby push refusal	563
26											Drilled without sampling to 34 ft.	562
27											Changed to pitcher sample equipment	561
28												560
29												559
30												558
31												557
32												556
33												555
34											Pitcher drill from 34 to 36 ft.	554
35		UD 5		0/24						No recovery.		553
36											Drilled without sampling to 40 ft. Tricone refusal, boring terminated	552
37												551
38												550
39												549
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1048**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch / NQ	Boring Location ISFSI N 1167477 E 1847718		Total Depth 84.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.5 feet MSL	Ground Water Depth 25 feet	Depth to Bedrock 44.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 4/27/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 4/29/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML); strong brown (7.5YR 5/8); damp, stiff, sand ~10%, clay <10 to 15%, very fine sand, manganese oxide, veins, mottled. FILL	Begin drilling 4/27/06	587–584
4		SPT 1	3 4 5	20.4/18								583
5–13									ML	SILT, sandy (ML); red (2.5YR 4/8) to yellowish brown (10 YR 5/4); damp, medium stiff, manganese oxide, veining. RESIDUUM		582–574
9		SPT 2	2 3 4	18/18								
14		SPT 3	3 3 4	18/18					ML	SILT, sandy (ML); light gray (7.5Y 7/4); damp, medium stiff, relict foliation apparent with parallel manganese veining, 74% fines. SAPROLITE	B-1048-UD, UD-2 at 14 to 16 ft	573–570
19		SPT 4	2 4 5	14.4/18						SAA; dark brown (10YR 3/3) to yellowish red (5YR 5/8); stiff, moist, sand (very fine) manganese oxide veins parallel to foliation. SAPROLITE		569–565
24		SPT 5	3 6 8	18/18					▽	SAA; olive gray (5Y 4/2) with reddish yellow (7.5YR 6/8) veins occasional damp, stiff, 1% gravel, 63% fines. SAPROLITE	B-1048-UD, UD-2 at 24 to 26 ft	564–560
29		SPT 6	12 22 48	18/18						SAA; light gray (10YR 7/2) to olive (5Y 5/3); hard, damp, fine to medium. SAPROLITE		559–556
34		SPT 7	11 12 24	16.8/18						SAA; olive gray (5Y 4/2); damp; hard; sand is very fine. SAPROLITE		555–552
39		SPT 8	7 11 17	20.4/18						SAA; olive gray (5Y 4/2); damp, very stiff. SAPROLITE		551–548

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1048

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												547
41												546
42									SM	SAND, silty, clayey (SM) with gravel; olive gray to dark olive gray (5Y 4/3 to 5Y 3/2); very hard, damp, <10% silt and clay, 60% sand, 40% gravel. PARTIALLY WEATHERED ROCK AT 43.9 ft.		545
43												544
44		SPT 9	50/4	0/4							Refusal at 44.4 ft., see rock log	543
45												542
46												541
47												540
48												539
49												538
50												537
51												536
52												535
53												534
54												533
55												532
56												531
57												530
58												529
59												528
60												527
61												526
62												525
63												524
64												523
65												522
66												521
67												520
68												519
69												518
70												517
71												516
72												515
73												514
74												513
75												512
76												511
77												510
78												509
79												508
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1048**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch / NQ	Boring Location ISFSI N 1167477 E 1847718		Total Depth 84.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.5 feet MSL	Ground Water Depth 25 feet	Depth to Bedrock 44.5 feet
Casing Size and Depth 3.5 inch / 44.5 feet	Length of Core Barrel and Bit 8 feet / 8 feet	No. of Core Boxes 3	Date Started 4/27/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 4/29/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
45–49	1	1.7/5.0	0	HW to MW	R1 to R2		META-QUARTZ DIORITE; speckled light gray (10YR 7/1) to gray (10YR 6/6) to dark gray (10YR 4/1); equigranular; xenoblastic 40% feldspar, 25 to 30% mafics; biotite and hornblende, minor pyrite; occasional amphibolite xenoliths. PARTIALLY WEATHERED ROCK	Tricone refusal at 44.4 ft, drilled casing to 44.5 to start rock coring Start NQ core on 4/28/06. Total water loss Water loss continuous	543–539
50–54	2	2.4/5.0	20	HW to MW	R1 to R2			Water loss continuous	538–534
55–59	3	4.0/5.0	30	MW	R2 to R3			Water loss continuous	533–529
60–63	4	3.4/3.6	42	MW	R2				528–525
63–64	5	0.5/1.4	0	HW to MW	R1				524
65–67	6	4.6/5.0	54	HW to MW	R1 to R3		AMPHIBOLITE to META-DIORITE; dark gray, hornblende, mica, biotite, plagioclase and pyrite; porphyroblasts randomly oriented; Epidote? green mineralization within 3 mm of contact	PARTIALLY WEATHERED ROCK	523–521
67–69							META-QUARTZ DIORITE OR META-GRANODIORITE		520–519
70–73	7	4.9/5.0	78	MW to SW	R2 to R3		SAA. META-QUARTZ DIORITE to META-GRANODIORITE. CONTINUOUS ROCK		518–515
74							AMPHIBOLITE to META-DIORITE; dark gray, equigranular, fine grained		514
75–79	8	4.1/5.0	68	SW	R4		META-QUARTZ DIORITE; sheared, with healed mylonitized fabric near (within 6 inch contact); calcite fills the finely sheared zone near contact.		513–509
80–82	9	3.3/3.3	91	SW	R3 to R4		META-GRANODIORITE or META-QUARTZ DIORITE; orthoclase-rich or plagioclase rich (altered)		508–505
83	10	1.7/1.7	76	SW	R3 to R4		SAA; epidote rich vein; brecciated and healed		504
84							META-DIORITE to AMPHIBOLITE; dark gray,		503

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1048

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
85								porphyroblastic	Coring terminated on 4/29/06; water at 25 ft	503
86										502
87										501
88								Total Depth 84.5 ft. Groundwater encountered at 25 feet Borehole Grouted On 4/29/06		500
89										499
90										498
91										497
92										496
93										495
94										494
95										493
96										492
97										491
98										490
99										489
100										488
101										487
102										486
103										485
104										484
105										483
106										482
107										481
108										480
109										479
110										478
111										477
112										476
113										475
114										474
115										473
116										472
117										471
118										470
119										469
120										468
121										467
122										466
123										465
124										464
										463

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1048-UD**	
Type and Diameter of Boring Wash Rotary / 4 inch	Boring Location ISFSI N 1167471 E 1847715		Total Depth 26 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 587.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 3	Date Started 6/11/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/11/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling to 4 ft.	587
1												586
2												585
3												584
4											Shelby push 4 to 6 ft	583
5		UD 1		21.6/24					ML	SILT, sandy (ML).		582
6											Drilled without sampling to 14 ft.	581
7												580
8												579
9												578
10												577
11												576
12												575
13												574
14											Shelby push 14 to 16 ft	573
15		UD 2		15.6/24	●	●	●		ML	SILT, sandy (ML); 26% sand, 74% fines.		572
16											Drilled without sampling to 24 ft.	571
17												570
18												569
19												568
20												567
21												566
22												565
23												564
24											Shelby push 24 to 26 ft.	563
25		UD 3		24/24	●	●	●		ML	SILT, sandy (ML); 1% gravel, 36% sand, 63% fines.		562
26											Boring terminated at 26 ft on 6/11/06	561
27												560
28												559
29												558
30												557
31												556
32												555
33												554
34												553
35												552
36												551
37												550
38												549
39												548
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1049**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location ISFSI N 1167470 E 1847541		Total Depth 81 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.4 feet MSL	Ground Water Depth 23.8 feet	Depth to Bedrock 31 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 4/29/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/27/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML); red (2.5YR 5/8); dry, stiff, <5% clay, <10% sand, fine to coarse sand. FILL	Start on 4/29/06	587–584
4–5		SPT 1	6 7 7	19.2/18	●							583–582
7–8									ML	SILT, sandy (ML); very pale brown (10YR 8/3 and 10YR 7/3); damp, medium stiff, very fine <1% clay; manganese oxide veins subhorizontal. SAPROLITE		581–580
9–10		SPT 2	2 2 4	15.6/18								579–577
14–15		SPT 3	4 5 7	18/18					SP	SAND, silty (SP); gray (10YR 6/1) to yellow (10YR 7/6); medium dense, damp, fine grained. SAPROLITE		576–573
19–20		SPT 4	6 7 14	16.8/18						SAND, (SP); light gray (10YR 7/1); white (10YR 8/1), and yellow (10YR 8/6); damp, medium dense, fine grained, <5% clay, <10% silt. SAPROLITE		572–569
24–25		SPT 5	7 11 12	15.6/18					∇	SAND, (SP) as above; medium dense, manganese oxide vein (~45° dip). SAPROLITE		568–564
29–30		SPT 6	12 13 12	16.8/18						SAND, (SP); grayish brown (10YR 5/2) to white (5Y 8/1); damp; medium dense. SAPROLITE		563–558
31											SPT sampling terminated at 31.0 ft. See rock core log.	557
32–40												556–548

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1049**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location ISFSI N 1167470 E 1847541		Total Depth 81 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.4 feet MSL	Ground Water Depth 23.8 feet	Depth to Bedrock 31 feet
Casing Size and Depth 3.5 inch / 31 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 3	Date Started 4/29/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/1/06

Reviewed by / Date F. Syms 5/27/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
31–36		1	3.6/5.0	52	MW to HW	R1 to R3		META-QUARTZ DIORITE or META-GRANODIORITE; black, pale yellow, light gray, speckled equigranular. Weak 20° foliation in upper and ~30° in mid to lower core. Mafics (hornblende, biotite, minor pyrite probably) 15 to 40%. Feldspar ~40%, quartz ~10 to 20% (gray blue)	Tricone refusal on 4/29/06 Start NQ rock core on 4/30/06; water at 18.3 ft	556–552
36–41		2	5.0/5.0	88	SW	R3 to R4		SAA. CONTINUOUS ROCK SAA	Total water loss.	551–547
41–46		3	4.9/5.0	70	MW to SW	R3 to R4		Fabric becomes increasingly gneissic, felsic and mafic mineral separation and banding is more pronounced.		546–542
46–51		4	5.0/5.0	98	SW to F	R4 to R5				541–537
51–56		5	4.9/5.0	92	SW to F	R4 to R5				536–532
56–61		6	5.0/5.0	100	SW to F	R4 to R5		META-QUARTZ DIORITE; Speckled black, gray, blue gray; equigranular, aggregates fine grained; mafic and felsic minerals; xenoblastic except in veins		531–527
61–66		7	4.9/5.0	96	SW to F	R4 to R5				526–522
66–71		8	5.1/5.1	94	F	R4 to R5		SAA Foliation strong and very closely spaced healed fractures with shear, offset approximately 1 cm.	End day 4/30/06 5/1/06 start drilling; water level at 23.8 ft 100% water loss	521–517

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1049

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
71								SAA		516
72									Water loss continues	515
73		9	4.8/4.9	97	F	R5				514
74										513
75										512
76		10	0.5	100	F	R5		SAA		511
77			0.5							510
78										509
79		11	4.5/4.5	93	F	R5				508
80										507
81									Coring terminated on 5/1/06	506
82										505
83										504
84								Total Depth 81 ft.		503
85								Groundwater encountered at 23.8 feet		502
86								Borehole Grouted On 5/1/06		501
87										500
88										499
89										498
90										497
91										496
92										495
93										494
94										493
95										492
96										491
97										490
98										489
99										488
100										487
101										486
102										485
103										484
104										483
105										482
106										481
107										480
108										479
109										478
110										477
111										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389			**SOIL LOG - Boring No. B-1050**
Type and Diameter of Boring Wash Rotary / NQ core / 3.75 inch / NQ	Boring Location Unit 1 N 1164915 E 1846053		Total Depth 73.4 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 597 feet MSL	Ground Water Depth 13 feet	Depth to Bedrock 3.4 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 15	Date Started 5/2/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/3/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SP	Field straw grass root mat ~3 inch	Begin drilling 5/2/06	597
1										Gravel with sand and silt, very dense, dry, finable.	Very hard drilling	596
2										PARTIALLY WEATHERED ROCK		595
3		SPT 1	50/4	4/4								594
4												593
5												592
6												591
7												590
8												589
9												588
10												587
11												586
12												585
13												584
14												583
15												582
16												581
17												580
18												579
19												578
20												577
21												576
22												575
23												574
24												573
25												572
26												571
27												570
28												569
29												568
30												567
31												566
32												565
33												564
34												563
35												562
36												561
37												560
38												559
39												558
40												557

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1050**	
Type and Diameter of Boring Wash Rotary / NQ core / 3.75 inch / NQ	Boring Location Unit 1 N 1164915 E 1846053		Total Depth 73.4 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 597 feet MSL	Ground Water Depth 13 feet	Depth to Bedrock 3.4 feet
Casing Size and Depth 3.75 inch / 3.4 feet	Length of Core Barrel and Bit 13.1 feet / 13.1 feet	No. of Core Boxes 3	Date Started 5/2/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 5/3/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
4–8	2	1.2/5.0	0	RS to CW	R1 to R2		META-GRANODIORITE to META-QUARTZ DIORITE; dark reddish brown (5YR 2.5/2); fine grained; biotite, muscovite, quartz, altered plagioclase and pyrite. PARTIALLY WEATHERED ROCK.	Begin NQ rock core	593–589
9–13	3	1.5/5.0	0	RS to CW	R1 to R2		SAA.		588–584
14–18	4	1.4/5.0	0	RS to CW	R1 to R2				583–579
19–23	5	1.0/5.0	0	RS to CW	R1 to R2				578–574
24–28	6	1.5/5.0	0	RS to CW	R0 to R1		SAA; increased mafic minerals, biotite, muscovite, hornblende		573–569
29–33	7	0.8/5.0	0	RS to CW	R0 to R1		META-DIORITE; dark reddish brown (5YR 2.5/2); fine grained; mafic minerals include biotite, and hornblende; highly weathered plagioclase. PARTIALLY WEATHEREED ROCK		568–564
34–38	8	0.9/5.0	0						563–559
39–43	9	2.3/5.0	7	HW	R3		META-QUARTZ DIORITE; very dark gray (10YR 3/1) and dark reddish brown; fine grained, quartz, plagioclase, hornblende, biotite, muscovite.		558–554

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1050

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
44		10	1.3/5.0	0	RS to CW	R1				553
45						R0 to R1				552
46					HW	R2				551
47					RS to CW	R0 to R1				550
48										549
49		11	1.7/5.0	10				SAA; bluish gray (5PB 6/1); fine grained, hornblende, plagioclase, biotite, pyrite, quartz.	End day 5/2/06 Begin 5/3/06; water at 13 ft	548
50										547
51										546
52					HW	R2				545
53					RS to CW	R0 to R1				544
54		12	1.9/5.0	0	HW	R2				543
55										542
56					RS to CW	R0 to R1				541
57										540
58										539
59		13	3.5/5.0	44				META-QUARTZ DIORITE; bluish gray; fine grained, hornblende, quartz, plagioclase. PARTIALLY WEATHERED ROCK		538
60					HW	R2				537
61					RS to CW	R0 to R1				536
62										535
63										534
64		14	5.0/5.0	100				META-QUARTZ DIORITE; bluish gray; fine to medium grained, most fractures healed with quartz and micaceous minerals. CONTINUOUS ROCK.		533
65										532
66								Quartz Pegmatite vein.		531
67					SW to F	R3		Subvertical fractures healed with quartz.		530
68										529
69		15	5.0/5.0	100				META-QUARTZ DIORITE; bluish gray; fine grained; hornblende, quartz, plagioclase, biotite.		528
70										527
71								Foliation dipping 50° perpendicular to healed quartz fractures.		526
72										525
73										524
74									Coring terminated on 5/3/06	523
75										522
76								Total Depth 73.4 ft.		521
77								Groundwater encountered at 13 feet		520
78								Borehole Grouted On 5/3/06		519
79										518
80										517
81										516
82										515
83										514

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1051**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 1 Pipeline N 1164991 E 1846392		Total Depth 71.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.7 feet MSL	Ground Water Depth 14.7 feet	Depth to Bedrock 26.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 5	Date Started 5/9/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/10/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–8									CL	CLAY, silty (CL); yellowish red (5YR 5/6) to grayish brown (2.5Y 5/2); damp, stiff, <10% sand, occasional subangular rock fragment (<3 mm). FILL	Start 5/9/06	587–580
4–5		SPT 1	4 5 4	19.2/18								
9–10		SPT 2	8 12 9	13.2/18	●	●			SM	SAND, silty with gravel (SM); grayish brown (5YR 5/6); dry; subangular; gravel sized rock pieces. FILL		579–578
									SM	SAND, silty (SM) with gravel, reddish yellow (7.5YR 6/8) to yellow (10YR 8/6), damp, medium dense, 21% gravel, 51% sand, 28% fines; SAPROLITE		577–575
14–15		SPT 3	26 40 29	15.6/18	●	●			▽	SAND, silty with gravel (SM); yellowish brown (10YR 5/6) to light yellowish brown (10YR 6/4), damp, very dense, 4% gravel, 62% sand, 34% fines. SAPROLITE		574–570
19–20		SPT 4	12 20 50/5	13.2/17	●	●				SAND, silty (SM); yellowish brown (10YR 5/6); damp, very dense, mostly medium grained sand, 28% gravels, 56% sand, 16% fines. SAPROLITE		569–565
24–25		SPT 5	14 18 31	18/18	●	●				SAND, silty, with gravel (SM); brown to very dark brown (10YR 4/3 to 10YR 3/1) to strong brown (7.5YR 5/6); damp, dense, 2% gravels, 61% sand, 37% fines. SAPROLITE	Tricone refusal 26.5 ft., see rock log	564–548

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1051**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 1 Pipeline N 1164991 E 1846392		Total Depth 71.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.7 feet MSL	Ground Water Depth 14.7 feet	Depth to Bedrock 26.5 feet
Casing Size and Depth 3.5 inch / 26.5 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 3	Date Started 5/9/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/10/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
27–30	1	3.5/4.0	0	HW to MW	R2		META-DIORITE to AMPHIBOLITE; black (2.5Y 2/0) to yellowish red (5YR 5/8) where weathered; equigranular; fine grained >50 to 60% mafic minerals (hornblende, biotite?, pyroxene?), 40 to 50% plagioclase? mostly strongly foliated near quartz veining. Very closely spaced incipient and healed fractures joints throughout. PARTIALLY WEATHERED ROCK.	Tricone refusal switched to NQ rock coring. Losing ~20% water	561–558
31	2	0.7/1.0	0	HW	R2				557
32–34	3	2.0/3.8	0	HW	R1 to R2			70% water loss	556–554
35							More leucocratic and coarse grained, more brecciated 34.5 to 43.5 ft		553
36	4	1.3/1.2	69	HW to MW	R2			End 5/9/06 Start 5/10/06	552
37–43	5	4.7/4.8	35	MW	R2		META-QUARTZ DIORITE or META-DIORITE; brecciated with very closed spaced fractures, slightly more coarse grained texture. SAA; healed or filled fracture joints throughout entire core. Orientations vary, intersecting and irregular. More brecciated in lower part of run 5.		551–545
42–43	6	2.0/2.2	41	MW	R2				546–545
44–46	7	2.5/3.0	13	HW to MW	R2		METADIORITE to AMPHIBOLITE; upper ~ 1 ft. mylonitized? to schistose and darker color (dark gray) and more mafic than above.	~80% water loss	544–542
47–49	8	2.7/2.7	15	HW	R2				541–539
50–51	9	1.0/2.3	0	HW to MW	R2		META-QUARTZ DIORITE or META-DIORITE; gray to brownish gray; equiangular, fine grained; (mafic inclusions) around hornblende? Hornblende and biotite 50 to 70%, plagioclase and quartz 50 to 30%		538–537
52–53	10	2.4/2.4	16	HW to MW	R2		Rock is weathered with MgO mineralization in all fracture and joint surfaces, and some FeO staining also. Veins forming along incipient joints and foliation joints, very closely spaced incipient joints, fractures.		536–535
54–56	11	1.7/2.6	0	HW to MW	R2		SAA, but also moderately spaced veins of quartz obliquely to vertical Minor calcite and epidote associated wtih quartz veins		534–532
57–61	12	4.8/5.0	68	MW to SW	R2 to R3		SAA. PARTIALLY WEATHERED ROCK.		531–527
62–66	13	5.0/5.0	64	MW to SW	R2 to R3			100% water loss	526–522

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1051

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
67								META-DIORITE or AMPHIBOLITE; as above, but more weathered. PARTIALLY WEATHERED ROCK.		521
68										520
69		14	4.6 / 5.0	18	HW to MW	R2 to R3				519
70										518
71										517
72									Coring terminated on 5/10/06; water at 14.7 ft	516
73										515
74								Total Depth 71.5 ft.		514
75								Groundwater encountered at 14.7 feet		513
76								Borehole Grouted On 5/10/06		512
77										511
78										510
79										509
80										508
81										507
82										506
83										505
84										504
85										503
86										502
87										501
88										500
89										499
90										498
91										497
92										496
93										495
94										494
95										493
96										492
97										491
98										490
99										489
100										488
101										487
102										486
103										485
104										484
105										483
106										482

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1052**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 1 Pipeline N 1165181 E 1846736		Total Depth 70.7 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.4 feet MSL	Ground Water Depth 26.5 feet	Depth to Bedrock 53.7 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 11	Date Started 5/3/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/9/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–8									ML	SILT, (ML); yellowish red (5YR 5/8); damp, stiff, <5% clay and <5 % sand (very fine), low plasticity, some subangular rock fragments. FILL	Start 5/3/06 Fill	587–579
4–5		SPT 1	2 3 6	15.6/18								583–582
9–10		SPT 2	3 3 5	16.8/18	●	●			SC	SAND, clayey with gravel (SM); gray (5Y 6/1); damp, loose, 10% gravel, 46% sand, 44% fines medium plasticity. ALLUVIUM		578–577
10–12									CL	CLAY, silty, sandy (CL); pale yellow (2.5Y 7/6) and yellowish red (5YR 5/8). SAPROLITE		577–575
13–18		SPT 3	50/6	6/6	●	●			SM	SAND, silty with gravel (SM); very pale brown (10YR 7/4); damp to moist, 8% gravel, 70% sand, 22% fines. Grains are angular to subangular. PARTIALLY WEATHERED ROCK		574–570
18–23		SPT 4	50/4.5	5.4/4.5	●	●				SAND, silty with gravel (SM); dark grayish brown (2.5Y 4/2), moist, 7% gravel, 63% sand, 30% fines well graded, gravels are subangular. PARTIALLY WEATHERED ROCK		569–564
23–28		SPT 5	50/4	4/4	●	●			GM	GRAVEL with silt (GM); dark grayish brown (2.5Y 4/2); moist; 43% gravel, 42% sand, 15% fines. PARTIALLY WEATHERED ROCK		564–561
28–33		SPT 6	50/5	6/5						SAA; grayish brown (2.5Y 5/2); damp, <10% clay, well graded to moderately graded. PARTIALLY WEATHERED ROCK		559–554
33–38		SPT 7	50/5.5	5.5/5.5						SAA; olive gray (5Y 5/2). PARTIALLY WEATHERED ROCK		554–549
38–40		SPT 8	50/1	1/1								549–548

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1052

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												547
41												546
42												545
43												544
44		SPT 9	12 20 31	18/18					ML	SILT, sandy (ML); pinkish white (7.5YR 8/2) and reddish yellow (7.5YR 7/8) and dark brown (7.5YR 4/2); damp, poorly graded, low plasticity. PARTIALLY WEATHERED ROCK		543
45												542
46												541
47												540
48												539
49		SPT 10	50/3	4.8/3					GW	GRAVEL, sandy (GW) olive gray (5Y 5/2); damp, ~10% clay, angular to subangular gravels (<1 cm). PARTIALLY WEATHERED ROCK.	End of drilling 5/3/06 Begin drilling 5/8/06; water at 26.5 ft Hard drilling 48.8 to 53.7 ft	538
50												537
51												536
52												535
53												534
54		SPT 11	50/2	0/2						No recovery.	Tricone refusal 53.65 ft., see rock log	533
55												532
56												531
57												530
58												529
59												528
60												527
61												526
62												525
63												524
64												523
65												522
66												521
67												520
68												519
69												518
70												517
71												516
72												515
73												514
74												513
75												512
76												511
77												510
78												509
79												508
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1052**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 1 Pipeline N 1165181 E 1846736		Total Depth 70.7 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.4 feet MSL	Ground Water Depth 26.5 feet	Depth to Bedrock 53.7 feet
Casing Size and Depth 3.5 inch / 53.7 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 1	Date Started 5/3/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/9/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
54–58		1	5.0/5.0	50	MW	R3		META-GRANODIORITE or META-QUARTZ DIORITE; speckled gray, black, buffed, equigranular. ~30% quartz, ~30% mafics, ~30 feldspar (plagioclase).	Tricone refusal, begin NQ core	533–529
59–63		2	4.7/5.0	66	MW to SW	R3		SAA. Very closely spaced calcite healed fractures.		528–524
64–66		3	4.5/4.5	62	SW	R3		Increase in mafic minerals and development of foliation and healed mylonitization fabric		523–522
66–68								META-QUARTZ DIORITE; increasingly healed mylonitized and foliated fabric.		521–520
68–70		4	2.5/2.5	72	SW	R3		SAA. CONTINUOUS ROCK	100% water loss ~50% water loss	519–517
71–93								Total Depth 70.7 ft. Groundwater encountered at 26.5 feet Borehole Grouted On 5/9/06	Coring terminated on 5/9/06	516–494

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1053**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Unit 2 Pipeline N 1165781 E 1847797		Total Depth 13.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 2	Date Started 5/11/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/11/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Start on 5/11/06	589
1												588
2												587
3												586
4		SPT 1	2 2 4	15.6/18						SILT, sandy, gravelly (ML); yellowish red (5YR 5/6 to 5YR 4/6); damp, medium stiff, <20% sand, <5% clay, angular gravels, low to medium plasticity, sands are fine to medium grained. FILL		585
5												584
6												583
7												582
8												581
9		SPT 2	0 0 2	0/18						No sample recovery, very soft.		580
10												579
11												578
12												577
13												576
14											Boring terminated at 13.5 ft on 5/11/06 due to apparent subsurface obstruction continue drilling on B-1053A offset 3.6 ft southerly	575
15												574
16												573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1053-UD**	
Type and Diameter of Boring Wash Rotary / 4 inch	Boring Location Unit 2 Pipeline N 1165682 E 1847817		Total Depth 26.3 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 589.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 2	Date Started 6/8/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 6/8/06

Reviewed by / Date B. Reinicker 6/13/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Offset 3.4 ft from B-1053C Drilled without sampling to 19 ft.	589
1												588
2												587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10												579
11												578
12												577
13												576
14												575
15												574
16												573
17												572
18												571
19		UD 1		26.75 / 27.25					ML	SILT, sandy (ML).	Shelby push 19 to 21.3 ft	570
20												569
21												568
22											Drilled without sampling to 24 ft.	567
23												566
24		UD 2		25.5 / 26.75	●	●	●		ML	SILT, sandy (ML); 71% fines, 29% sand.	Shelby push 24 to 26.3 ft	565
25												564
26											Boring terminated at 26.3 ft	563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1053A**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Unit 2 Pipeline N 1165778 E 1847798		Total Depth 16 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 1	Date Started 5/11/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/11/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drilled without sampling to 13.5 ft, see B-1053. FILL	B-1053A is offset 3.6 ft from B-1053 to the south. Drilled without sampling to 13.5 ft	589
1												588
2												587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10											Drill clanging, possible subsurface obstruction.	579
11												578
12												577
13												576
14		SPT 1	0 1 2	6/18					ML	SILT, sandy (ML); brown (7.5YR 5/4); moist, soft, fine to medium sand, minor gravel sized component, 30 to 40 % sand. FILL	Begin SPT sampling	575
15											Tricone refusal at 16.0 ft. on 5/11/06; possible subsurface obstruction, boring terminated Offset ~17 ft west to B-1053B to continue drilling	574
16												573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1053B**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Unit 2 N 1165778 E 1847780		Total Depth 13.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method	Sample Driving Hammer/Drop	No. of Samples	Date Started 5/12/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/12/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–13										Drilled without sampling to 13.5 ft No sample collected	Start 5/12/06 Drilled without sampling to 13.5 ft	589–576
14–40											No sample recovered Boring terminated due to possible subsurface obstruction and offset to B-1053C ~100 ft southerly to continue drilling	575–550

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1053C**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 Pipeline N 1165682 E 1847809		Total Depth 69.2 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.5 feet MSL	Ground Water Depth 17.4 feet	Depth to Bedrock 54.2 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 11	Date Started 5/12/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/12/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, (ML); brown (7.5YR 5/4) to yellowish red (5YR 5/8); damp; medium stiff or soft; <15% fine grained sand, FILL	5/12/06 Start drilling	589–586
4	✓	SPT 1	2 3 4	15.6/18					SM	SAND, silty (SM); red (2.5YR 5/8) to very pale brown (10YR 7/3); damp, loose, >40 % silt; sand is fine to medium, manganese oxide veining. SAPROLITE		585–582
9	✓	SPT 2	2 3 5	16.2/18	●	●				SAA; brownish yellow (10YR 6/6) to light brownish gray (10YR 6/2) to very dark grayish brown (10YR 3/2); damp, loose; 53% sand, 47% fines, manganese oxide veins (relict) rock texture. SAPROLITE		581–578
14	✓	SPT 3	2 1 2	19.2/18	●	●				SAA; brownish yellow (10YR 6/8); moist and very loose, 4% gravel, 54% sand, 42% fines. SAPROLITE		576–573
17									▽			572
19	✓	SPT 4	1 2 2	12/18	●					SAA; damp, very loose, fine to coarse sand, manganese oxide veins, some fine gravels <5%, subangular. SAPROLITE		571–566
24	✓	SPT 5	2 2 4	19.2/18	●				ML	SILT, sandy (ML); gray (5Y 5/1) to yellow (2.5Y 7/6); moist, medium stiff, 29% sand, 71% fines. SAPROLITE	Classification based on B-1053-UD UD-2 from 24 to 26.3 ft	565–561
29	✓	SPT 6	9 11 14	15.6/18	●	●			SM	SAND, silty (SM); gray to white to olive gray (5Y 6/1 to 5Y 8/1 to 5Y4/2), damp, medium dense, 61% sand, 39% fines. SAPROLITE		560–556
34	✓	SPT 7	7 13 24	19.2/18	●					SAND, silty (SM); olive to dark olive (5Y 5/3 to 5Y 3/2); damp, dense, sand is mostly fine grained, micaceous. SAPROLITE		555–551
39	✓	SPT 8	12 26 50	18/18	●	●			ML	SILT, sandy (ML); light olive brown (2.5Y 5/4) to yellowish brown (10YR 5/8); damp, hard,		550

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1053C

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40									ML	manganese oxide veins more coarse grained; 33% sand, 67% fines. PARTIALLY WEATHERED ROCK		549
41												548
42									SM	SAND, silty (SM); olive brown (2.5Y 4/4). PARTIALLY WEATHERED ROCK		547
43												546
44		SPT 9	25 50/5	10.8 / 11	●							545
45												544
46												543
47												542
48												541
49		SPT 10	50/4	6 / 4						SAND, silty (SM); strong brown to dark brown (7.5YR 5/6 to 10YR 4/3); damp; fine to medium grained. PARTIALLY WEATHERED ROCK		540
50												539
51												538
52												537
53												536
54		SPT 11	50/3	4.8 / 3						SAND, silty, gravelly (SM); very dark grayish brown (10YR 3/2) to yellowish brown (10YR 5/6); damp, gravels >40% angular, sand is predominantly medium to coarse. PARTIALLY WEATHERED ROCK	Tricone refusal at 54.2 ft. see rock log	535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1053C**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 Pipeline N 1165682 E 1847809		Total Depth 69.2 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.5 feet MSL	Ground Water Depth 17.4 feet	Depth to Bedrock 54.2 feet
Casing Size and Depth 3.5 inch / 53.5 feet	Length of Core Barrel and Bit	No. of Core Boxes N/A	Date Started 5/12/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/12/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
55–59		1	4.8/5.0	58	HW to SW	R1 to R3		META-QUARTZ DIORITE; yellowish brown (10YR 5/8) to gray (10YR 6/1) to very dark gray (10YR 3/1); coarse, equigranular but mafics sometimes aggregates of very fine crystals. Plagioclase ~50%, quartz ~15 to 25%, hornblende and mica 15 to 25%	Tricone refusal at 54.2 ft. Switched to NQ rock core 100% water return	535–531
59–60								SCHIST; dark brown (10YR 3/3); fine grained hornblende schist.		530
60–64		2	4.6/5.0	54				META-DIORITE; dark gray (7.5YR 4/0) with white porphyroblasts of plagioclase (or quartz?); strong foliation of porphyroblast 50 to 60° with thin quartz veins parallel to the foliation, veins fractured and totally filled with calcite.		529–526
64–69		3	5.0/5.0	98				SAA. Foliation at 70°, moderate to closely spaced quartz veins typically cut by foliation. CONTINUOUS ROCK	100% water return	525–521
69–94								Total Depth 69.2 ft. Groundwater encountered at 17.4 feet Borehole Grouted On 4/13/06	Coring terminated on 5/12/06 5/13/06 water at 17.4 ft	520–496

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1054**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 N 1165836 E 1847569		Total Depth 83.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 590.9 feet MSL	Ground Water Depth 19.4 feet	Depth to Bedrock 43.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 5/13/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/14/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML); red (2.5YR 5/6) to grayish brown (2.5Y 5/2); damp to dry, stiff, ~30% sand, <20% clay, sands are very fine to coarse, mostly fine to medium, several gravel size (<3 cm) angular rock fragments in upper part. FILL	Start on 5/13/06	590–588
4–5		SPT 1	4 5 6	9.6/18								587–586
6–8												585–583
9–10		SPT 2	1 1/12	3.6/18						SAA; dark yellowish brown (10YR 4/4); wet, very soft, sand <40%, <10% clay, gravel sized fragments of fresh rock (upper part). FILL		582–581
11–13												580–578
14–15		SPT 3	0 0 1	6.6/18						SILT, sandy (ML); dark yellowish brown (10YR 4/4); moist to damp, very soft, sand 40%, fine to coarse (mainly fine grained). 5% clay. FILL		577–576
16–18												575–573
19–20		SPT 4	6 8 10	16.8/18					ML	SILT, sandy (ML); olive brown (2.5Y 4/4); damp, very stiff, manganese oxide veins. SAPROLITE		572–571
21–23												570–568
24–25		SPT 5	12 19 23	14.4/18					SM	SAND, silty with gravel (SM); very dark gray (2.5Y 3/1) to red (2.5 YR 4/8); damp, very dense, <20% silt, ~40% gravel (subangular to subrounded), micaceous. SAPROLITE		567–566
26–28												565–563
29–30		SPT 6	12 14	18/18					ML	SILT, sandy (ML); grayish brown (2.5Y 5/2) to very dark grayish brown (2.5Y 3/2); damp, very stiff, sand <20% very fine, micaceous. SAPROLITE		562–561
31–33												560–558
34–35		SPT 7	3 9 19	16.8/18						SILT, sandy (ML); light gray (10YR 7/1) (lower 1 ft) to dark olive gray (5Y 3/2) (upper 6 inch); damp, very stiff, <25% sand (very fine to medium grained), <10% clay, micaceous. SAPROLITE		557–556
36–38												555–553
39–40		SPT 8	3 3 6	18/18						SILT, sandy (ML); olive gray (5Y 4/2); damp, stiff. SAPROLITE		552–551

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1054

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												
41												550
42												549
43												548
44		SPT 9	50/0.5	0 / 0.5						No sample recovery. PARTIALLY WEATHERED ROCK	Very hard drilling with tricone Refusal at 43.5 ft., see rock log	547
45												546
46												545
47												544
48												543
49												542
50												541
51												540
52												539
53												538
54												537
55												536
56												535
57												534
58												533
59												532
60												531
61												530
62												529
63												528
64												527
65												526
66												525
67												524
68												523
69												522
70												521
71												520
72												519
73												518
74												517
75												516
76												515
77												514
78												513
79												512
80												511

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1054**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 N 1165836 E 1847569		Total Depth 83.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 590.9 feet MSL	Ground Water Depth 19.4 feet	Depth to Bedrock 43.5 feet
Casing Size and Depth 3.5 inch / 43.5 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 2	Date Started 5/13/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/14/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
44–48		1	4.5/5.0	84	SW	R3 to R4		META-QUARTZ DIORITE or META-DIORITE; gray to dark gray (2.5Y 5/1 to 2.5Y 4/1); fine to medium grained; foliated. Streaked fabric suggests slight mylonitization throughout.	Refusal at 43.5 ft. Begin NQ core Losing ~20% water	547–543
49–53		2	5.0/5.0	78	HW to SW	R1 to R3			100% water loss	542–538
					CW			PARTIALLY WEATHERED ROCK and SAPROLITE SILT, sandy (ML); grayish brown (2.5Y 5/2); damp, <20 to 30 % sand, some fragments of partially weathered rock, very micaceous. SAPROLITE	End of 5/13/06 5/14/06 Start drilling; water at 19.4 ft 100% water loss	
54–58		3	1.1/5.0	0	CW					537–533
59–61		4	3.7/5.0	34	HW to SW					532–530
								META-DIORITE; very dark gray (7.5YR 3/1); fine to medium grained, slightly foliated texture. Shear fabric dipping ~40°		
62–63										529–528
64–65		5	2.4/2.8	28	HW to MW			META-DIORITE schistose		527–526
66								META-QUARTZ DIORITE; white to dark yellowish brown, schistose		525
67		6	0.3/0.7	0	HW			GRANODIORITE; white to dark yellowish brown (10YR 8/2 to 10YR 4/4); strongly foliated; medium to fine grained, >70% mica		524
68		7	1.5/1.5	0	HW					523
69–71		8	1.4/5.0	14	HW			GRANODIORITE; lowest 0.3 ft is fracture zone fragments of altered weathered vugged calcite in filled quartz vein and schistose meta diorite.		522–520
72–73					SW to F			METADIORITE; very dark gray; fine grained; moderately foliated (50°); closely spaced calcite/quartz veins (<1 cm wide) parallel to foliation; coarse to medium grained ~72.4 ft. CONTINUOUS ROCK		519–518
74–77		9	5.0/3.7	98	SW to F					517–514
78		10	1.2/1.3	92	SW to F			Salt and pepper appearance sometimes seen where quartz veins are partially consumed or adjacent to them.		513
79–83		11	3.9/4.7	74	SW to F			METADIORITE		512–508

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1054

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
84		12	0.3 / 0.3	100	SW to F				Coring terminatd on 5/14/06	507
85										506
86								Total Depth 83.5 ft.		505
87								Groundwater encountered at 19.4 feet		504
88								Borehole Grouted On 4/14/06		503
89										502
90										501
91										500
92										499
93										498
94										497
95										496
96										495
97										494
98										493
99										492
100										491
101										490
102										489
103										488
104										487
105										486
106										485
107										484
108										483
109										482
110										481
111										480
112										479
113										478
114										477
115										476
116										475
117										474
118										473
119										472
120										471
121										470
122										469
123										468

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1055**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 N 1166463 E 1847463		Total Depth 66 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 590.5 feet MSL	Ground Water Depth 26.6 feet	Depth to Bedrock 46 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 5/14/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/15/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy, gravelly (ML); reddish brown (2.5YR 3/2) to red (2.5 YR 4/6) to yellowish brown (10YR 5/6); dry to damp, stiff, ~30 to 40% sand, mostly fine to medium grained, <5% clay, <20% gravels, angular to subangular. FILL	Start drilling 5/14/06	590–589
4–5		SPT 1	7 5 8	23.4 / 18								587–586
6–8												585–583
9–10		SPT 2	4 4 8	16.8 / 18	●	●				SILT, sandy (ML); yellowish red (5YR 5/6) and mottled red (10R 5/8); damp, stiff, 1% gravel, 56% fines, 43% sand. FILL	End 5/14/06 Start 5/15/06	582–581
11–13											Losing 80% water	580–578
14		SPT 3	2 3 4	15.6 / 18	●	●				SAA; reddish yellow (7.5YR 6/8); damp, 42% sand, 58% fines. FILL		577
15–18									SM	SAND, silty (SM); light reddish brown (2.5YR 6/4); loose. SAPROLITE		576–573
19–20		SPT 4	2 2 4	14.4 / 18	●	●				SAND, silty (SM); brownish yellow (10YR 6/6); damp, loose, sand 1% gravel, 54% sand, 45% fines, manganese oxide veins. SAPROLITE		572–571
21–23											Losing 80% water	570–568
24–25		SPT 5	2 2 3	3.6 / 18						SAA; wet, loose, and some (several <1 cm) weathered red stained quartz gravels. SAPROLITE		567–566
26–28									∇			565–563
29–30		SPT 6	3 4 7	14.4 / 18	●	●				SAA; light olive gray (5Y 6/2) to yellow (10YR 7/6) to yellowish red (5YR 5/8); damp, medium dense, 8% gravel, 53% sand, 39% fines, also manganese oxide veining, some minor coarse sand and fine quartz gravels. SAPROLITE.		562–561
31–33												560–558
34–35		SPT 7	4 5 8	13.2 / 18	●	●				SAND, silty (SM); brownish yellow (10YR 6/6) to white (10YR 8/2); damp, medium dense; 64% sand, 36% fines. SAPROLITE		557–556
36–38												555–553
39–40		SPT 8	9 12 24	14.4 / 18	●	●				SAA; brownish yellow (10YR 6/6); damp, dense, 61% sand, 39% fines. SAPROLITE		552–551

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1055

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40									SM			550
41												549
42												548
43												547
44									SM	SAND, silty with gravel (SM); brownish yellow (10YR 6/6); damp, very dense, 11% gravel, 64% sand, 25% fines, manganese oxide vein subvertical. SAPROLITE		546
45		SPT 9	28 50/5	11/11	●	●					Tricone refusal 45.8 ft, drilled casing to 46 ft, see rock log	545
46										SAND, silty with gravel (SM). PARTIALLY WEATHERED ROCK		544
47												543
48												542
49												541
50												540
51												539
52												538
53												537
54												536
55												535
56												534
57												533
58												532
59												531
60												530
61												529
62												528
63												527
64												526
65												525
66												524
67												523
68												522
69												521
70												520
71												519
72												518
73												517
74												516
75												515
76												514
77												513
78												512
79												511
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1055**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Unit 2 N 1166463 E 1847463		Total Depth 66 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 590.5 feet MSL	Ground Water Depth 26.6 feet	Depth to Bedrock 46 feet
Casing Size and Depth 3.5 inch / 46 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 2	Date Started 5/14/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/15/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
46–51	1	5.0/5.0	46	HW to MW	R2 to R3		META-GRANODIORITE or META-QUARTZ DIORITE; reddish yellow (7.5YR 7/8) alteration 46 to 48.5 ft to gray (7.5YR 6/1); medium to coarse grained, healed brecciated to ductilely sheared to slightly mylonitized fabric; feldspar 40 to 30 %; amphiboles and micas ~ 30%; quartz ~ 10%. CONTINUOUS ROCK	Losing 40% water	544–540
51–56	2	4.1/5.0	58	SW	R4		META-QUARTZ DIORITE; black to grayish brown (2.5Y 2.5/1) to 2.5Y 5/2); subvertical quartz vein (1 to 2 cm).		539–535
56–60	3	3.7/4.2	94	SW to F	R4		SAA; META-QUARTZ DIORITE. CONTINUOUS ROCK.		534–531
60–61	4	0.8/0.8	100	SW to F	R4				530
61–66	5	4.7/5.0	94	F	R4 to R5		SAA; increased mafic content (>50%) foliated weakly.		529–525
66							Total Depth 66 ft. Groundwater encountered at 26.6 feet Borehole Grouted On 4/16/06	Boring terminated 5/15/06 5/16/06; water at 26.6 ft	524
67–86									523–505

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1056**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163896 E 1846786		Total Depth 58.9 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 642.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 12	Date Started 4/12/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/13/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–8									ML	SILT, trace clay (ML); mottled red (2.5YR 4/8) and reddish yellow (7.5YR 6/6); dry, medium stiff, micaceous. RESIDUUM	Start drilling 4/12/06	642–635
4–5	✓	SPT 1	3 3 4	12/18								639–638
9–13	✓	SPT 2	2 2 2	13.2/18					ML	SILT, trace clay (ML); mottled red (2.5YR 4/8) and reddish yellow (7.5YR 6/6); dry, soft; with manganese oxide staining along relict fracture traces. SAPROLITE	Stopped on 4/12/06 Started 4/13/06	634–630
14–18	✓	SPT 3	3 3 5	12/18						SILT, (ML) with some very fine sand and trace clay, very pale brown (10YR 7/4), damp to dry; medium stiff; MnO staining and relict rock texture, micaceous. SAPROLITE		629–625
19–23	✓	SPT 4	3 3 5	12/18						SAA.		624–620
24–28	✓	SPT 5	4 5 7	14.4/18						SAA.		619–615
29–33	✓	SPT 6	4 6 8	15.6/18						SAA; slightly more fine sand; moist.		614–610
34–38	✓	SPT 7	8 10 14	14.4/18						SAA with slight color shift to light yellowish brown (10YR 6/4); medium stiff and highly micaceous. SAPROLITE		609–605
39–40	✓	SPT 8	8 11 17	15.6/18						SAA.		604–603

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1056

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												
41												602
42												601
43												600
44		SPT 9	11 13 19	15.6/18						SILT, sandy (ML), very fine sand; very sandy. SAPROLITE		599
45												598
46												597
47												596
48												595
49		SPT 10	6 8 13	18/18						SILT, (ML) with trace clay, light yellowish brown (10YR 6/4), moist, medium stiff, micaceous. SAPROLITE		594
50												593
51												592
52												591
53												590
54		SPT 11	9 14 43	15.6/18						SAA.		589
55									ML	SILT, sandy (ML) with trace clay, light yellowish brown (10YR 6/6); moist, hard, micaceous. PARTIALLY WEATHERED ROCK		588
56												587
57												586
58												585
59		SPT 11	50/4	4/4						SAA; olive brown (2.5YR 4/4). PARTIALLY WEATHERED ROCK	Boring terminated 4/13/06	584
60												583
61												582
62												581
63												580
64												579
65												578
66												577
67												576
68												575
69												574
70												573
71												572
72												571
73												570
74												569
75												568
76												567
77												566
78												565
79												564
80												563

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1057**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163743 E 1846819		Total Depth 54.8 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 639.1 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 11	Date Started 4/17/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/17/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, clayey (ML); variegated red (2.5YR 4/8); brownish yellow (10YR 6/6); and very pale brown (10YR 7/4), damp, medium stiff, micaceous, low plasticity, also some manganese oxide staining. SAPROLITE	Begin 4/17/06	639
1												638
2												637
3												636
4		SPT 1	2 2 3	16.8/18								635
5												634
6												633
7												632
8												631
9		SPT 2	2 2 4	16.8/18						SAA.		630
10												629
11												628
12												627
13												626
14		SPT 3	2 5 5	15.6/18						SILT, trace clay; variegated red (10R 4/8); olive brown (2.5Y 4/3); and olive yellow (2.5Y 6/8), damp, stiff, micaceous, variegated, non-plastic. SAPROLITE		625
15												624
16												623
17												622
18												621
19		SPT 4	2 3 4	16.8/18						SAA; red (2.5YR 5/8); yellow (10YR 7/6); and light gray (10YR 7/1); damp, medium, stiff, micaceous, non-plastic, manganese oxide staining. SAPROLITE		620
20												619
21												618
22												617
23												616
24		SPT 5	2 3 5	15.6/18						SAA; trace sand; yellow (10YR 7/6) and light gray (10YR 7/2); damp, medium stiff, thin, manganese oxide, stains, micaceous. SAPROLITE		615
25												614
26												613
27												612
28												611
29		SPT 6	3 3 5	18/18						SAA.		610
30										SAA; quartz vein (small gravel) at 29.8 ft.		609
31												608
32									SP-SM	SAND, silty, light gray (10YR 7/1) and yellow (10YR 7/6); damp, medium dense; with quartz vein at 34.5 ft. SAPROLITE		607
33												606
34		SPT 7	4 6 8	14.4/18								605
35												604
36												603
37									SP-SM	SAND, silty, light gray (10YR 7/1) and yellow (10YR 7/6), dense. PARTIALLY WEATHERED ROCK		602
38												601
39		SPT 8	10 13 18	12/18								600
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1057

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												599
41												598
42												597
43												596
44		SPT 9	18 25 26	16.8 / 18						SAA.		595
45												594
46												593
47												592
48												591
49		SPT 10	25 29 33	13.2 / 18					SW-SM	SAND, silty, variegated olive yellow (2.5Y 6/6) and light yellowish brown (2.5Y 6/3); damp, very dense, micaceous. PARTIALLY WEATHERED ROCK		590
50												589
51												588
52												587
53												586
54		SPT 11	47 48 50/3	15.6 / 15.6						SAA with some gravel. PARTIALLY WEATHERED ROCK	Refusal to SPT sampler at 54.8 ft, boring terminated on 4/17/06	585
55												584
56												583
57												582
58												581
59												580
60												579
61												578
62												577
63												576
64												575
65												574
66												573
67												572
68												571
69												570
70												569
71												568
72												567
73												566
74												565
75												564
76												563
77												562
78												561
79												560
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1058**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163577 E 1846860		Total Depth 45 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 638.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 4/15/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/17/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, trace sand (ML) and trace clay; red (2.5YR 4/8) and brownish yellow (10YR 6/8); damp to dry, medium stiff, micaceous. SAPROLITE.	Begin 4/15/06	638–635
4	✓	SPT 1	2 3 3	15.6/18							Stopped 4/15/06 Started 4/17/06	634
5–8												633–630
9	✓	SPT 2	3 4 5	14.4/18						SAA, stiff; 1/4 inch quartz vein at 9 ft and angling 50°.		629
10–13												628–625
14	✓	SPT 3	4 5 7	14.4/18						SILT (ML), red (2.5YR 5/8) and strong brown (7.5YR 5/8); damp, stiff, non-plastic, micaceous. SAPROLITE		624
15–18												623–620
19	✓	SPT 4	4 4 7	14.4/18						SILT (ML), red (2.5YR 5/8) and strong brown (7.5YR 5/8); damp, medium stiff, with prominent fracture traces with manganese staining (black), micaceous non-plastic. SAPROLITE		619
20–23												618–615
24	✓	SPT 5	3 5 5	15.6/18						SAA; with some clay, non to low plasticity. SAPROLITE		614
25–28												613–610
29	✓	SPT 6	4 5 6	14.4/18						SAA; brownish yellow (10YR 6/8), damp, stiff, micaceous, manganese oxide staining. SAPROLITE Quartz vein at 29.1 ft ~25°		609
30–33												608–605
34	✓	SPT 7	4 10 29	16.8/18								604
35–38									GW	GRAVEL (GW); gray (10YR 5/1); dense. PARTIALLY WEATHERED ROCK		603–600
39	✓	SPT 8	10 12 16	16.8/18					GP-GM	GRAVEL, silty (GP to GM); brownish yellow (10YR 6/8) and gray (10YR 6/1); damp to moist, mainly		599
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1058

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										quartz gravels, medium dense. PARTIALLY WEATHERED ROCK.		598
41												597
42												596
43												595
44		SPT 9	15 36 50/5.5	17.5						SAA; dense to very dense SAA; densde to very dense. PARTIALLY WEATHERED ROCK.		594
45											Refusal to SPT sampler on 4/17/06, boring terminated	593
46												592
47												591
48												590
49												589
50												588
51												587
52												586
53												585
54												584
55												583
56												582
57												581
58												580
59												579
60												578
61												577
62												576
63												575
64												574
65												573
66												572
67												571
68												570
69												569
70												568
71												567
72												566
73												565
74												564
75												563
76												562
77												561
78												560
79												559
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1059**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area west of Motor Pool N 1164621 E 1845733		Total Depth 55 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 687 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 13	Date Started 4/18/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/18/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									GW	GRAVEL (GW), yellowish brown (10YR 5/4); dry, very loose, gravel coarse and very fine sand, some low organic content, granitic and quartz gravels. FILL	Start 4/18/06	687–684
4–5		SPT 1	1 4 5	15.6/18					ML	SILT clayey (ML), dark red (2.5YR 3/6), dry to damp, medium stiff, micaceous. TOPSOIL ZONE	Apparent topsoil 4.1 to 4.5 ft over saprolite	683–682
5–8									ML	SILT (ML) dark red (2.5YR 3/6), and pinkish white (2.5YR 8/2), variegated, dry, stiff, non-plastic. SAPROLITE		682–679
9–10		SPT 2	4 6 9	18/18						SAA, without pinkish white, with an olive brown (2.5Y 4/4) variegation along with the red, damp, soft to medium stiff, non-plastic, very micaceous. SAPROLITE		678–677
11–13												676–674
14–15		SPT 3	3 6 7	15.6/18						SAA; variegated colors red, olive. brown, and pinkish white.		673–672
16–18												671–669
19–20		SPT 4	3 4 6	15.6/18						SAA, weak red (10R 4/4), red (10R 5/6), and light brown (7.5YR 6/4).		668–667
21–23												666–664
24–25		SPT 5	4 6 6	13.2/18					SM	SAND, silty (SM);, predominantly white (10YR 8/1) and yellow (10YR 7/6) with some pale red (10R 6/4); and manganese oxide staining, dry, medium dense, sand is very fine. SAPROLITE		663–662
26–28									ML	SILT, sandy (ML); variegated weak red (10R 4/4), light brown (7.5YR 6/4), olive brown (2.5Y 4/4), and red (2.5YR 4/6); damp to dry, medium stiff, micaceous, manganese oxide staining and quartz gravel vein at 29 ft, non-plastic. SAPROLITE		661–659
29–30		SPT 6	4 4 6	18								658–657
31–33												656–654
34–35		SPT 7	3 5 8	15.6/18						SILT, clayey (ML); variegated yellowish brown (10YR 5/8), and yellow (10YR 7/6); dry, stiff, manganese oxide staining, low plasticity. SAPROLITE		653–652
36–38												651–649
39–40		SPT 8	2 3 5	15.6/18						SAA, abundant relict fractures filled with very pale brown (10YR 8/4) colored mineral, also some dark,		648–647

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1059

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										yellowish brown (10YR 4/4).		647
41												646
42												645
43												644
44		SPT 3	5 5 9	13.2/18						SAA, dark red (2.5YR 3/6) and olive brown (2.5Y 4/4); low plasticity. SAPROLITE		643
45										SILT, clayey (ML) with talc, white(2.5YR 8/1), and pale red (10R 6/4); dry, soft and getting slightly sandy at 45 ft, non-plastic. SAPROLITE		642
46												641
47									GW-GM	GRAVEL, sandy, silty (GW to GM); dark red (10R 3/6) to light red (10R 6/8) with gray (2.5Y 6/1) smokey quartz, dry, very dense, gravel is large and angular, quartz vein. SAPROLITE		640
48												639
49		SPT 10	17 27 35	13.2/18								638
50												637
51												636
52									ML	SILT, clayey (ML), yellowish brown (10YR 5/6); damp, stiff, micaceous, low plasticity. SAPROLITE.		635
53												634
54		SPT 11	3 5 9	13.2/18							Boring terminated on 4/18/06	633
55												632
56												631
57												630
58												629
59												628
60												627
61												626
62												625
63												624
64												623
65												622
66												621
67												620
68												619
69												618
70												617
71												616
72												615
73												614
74												613
75												612
76												611
77												610
78												609
79												608
80												607

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1060**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163796 E 1847079		Total Depth 54.4 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 634.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140.5 lbs / 30 inches	No. of Samples 11	Date Started 4/13/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/14/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, clayey (ML), mottled red (2.5YR 4/8) and reddish-yellow (7.5YR 6/8); damp, medium stiff, low plasticity, slightly micaceous. RESIDUUM.	Begin drilling 4/13/06	634–631
4–5		SPT 1	2 2 4	10.8/18								630
6–8									ML	SILT, clayey, trace sand (ML); mottled, red (10R 4/8), yellowish red (5YR 5/6), and reddish yellow (7.5YR 6/6); moist, medium stiff, manganese oxide staining, micaceous, and non-plastic to low plasticity. SAPROLITE.		629–627
9–10		SPT 2	2 2 3	15.6/18								626–625
11–13												624–622
14–15		SPT 3	2 2 4	10.8/18						SAA.	End drilling 4/13/06 Resumed on 4/14/06	621–620
16–18												619–617
19–20		SPT 4	2 3 5	16.8/18						SILT (ML) with trace clay; mottled red (2.5YR 5/8) and reddish-yellow (7.5YR 6/6); moist, medium stiff, manganese oxide staining (black) with 1/2 inch quartz gravel vein zone at 20 ft, non-plastic, micaceous. SAPROLITE.		616–615
21–23												614–612
24–25		SPT 5	2 3 5	14.4/18						SILT, clayey (ML), mottled pinkish gray (7.5YR 6/2) and reddish yellow (7.5YR 6/6), moist, medium stiff; manganese oxide staining, low-plasticity, micaceous. SAPROLITE		611–610
26–28												609–607
29–30		SPT 6	3 4 7	15.6/18					ML	SILT, sandy (ML); light yellowish brown (10YR 6/4); moist, stiff, micaceous, very fine sand, non-plastic. SAPROLITE		606–605
31–33												604–602
34–35		SPT 7	4 7 10	13.2/18						SAA; trace to some clay, non-plastic to low plasticity.		601–600
36–38												599–597
39–40		SPT 8	3 10 17	15.6/18						SAA, with an interval from 38.5 to 38.9 ft of mottled yellowish brown (10YR 5/8) and olive gray (5Y 5/2).		596–595

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1060

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										SAPROLITE		594
41												593
42									SP-SM	SAND, silty (SP to SM), yellow (10YR 7/6); moist, dense, non-plastic, micaceous, very fine silt. SAPROLITE.		592
43												591
44		SPT 9	10 23 27	15.6 / 18								590
45												589
46												588
47												587
48												586
49		SPT 10	15 26 37	15.6 / 18						SAA; very dense.		585
50												584
51												583
52												582
53												581
54		SPT 11	36 50/5	10.8 / 11						SAA. SAPROLITE	Refusal to SPT at 54.4 ft, boring terminatd on 4/14/06	580
55												579
56												578
57												577
58												576
59												575
60												574
61												573
62												572
63												571
64												570
65												569
66												568
67												567
68												566
69												565
70												564
71												563
72												562
73												561
74												560
75												559
76												558
77												557
78												556
79												555
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1061**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area west of Motor Pool N 1164300 E 1845630		Total Depth 50 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 685.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140.5 lbs / 30 inches	No. of Samples 10	Date Started 4/23/06
	Borehole Inclination -90	Logged by M. Gray/A. Tillery	Date Completed 4/23/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT (ML); red (10YR 4/6); dry, medium stiff to stiff, trace clay. RESIDUUM	Begin drilling 4/23/06	685
1												684
2												683
3												682
4		SPT 1	3 3 5	18/18								681
5										SAA. Quartzite clast.		680
6												679
7												678
8												677
9		SPT 2	4 6 11	16/18						SILT (ML); red (10YR 3/6); dry to damp, very stiff, bonds of lighter silt (yellow) mottled. RESIDUUM		676
10												675
11												674
12												673
13												672
14		SPT 3	5 8 12	14/18						SILT (ML); red (10YR 4/8); dry to damp, very stiff; mottled with pale yellow/gray silt medium MnO, micaceous fabric; Fractures at 35 to 45° lined with yellow silt. RESIDUUM		671
15												670
16												669
17												668
18												667
19		SPT 4	5 9 12	12/18						SILT (ML); red (10YR 3/6); damp, very stiff, laminated 0.1 inch band of yellow, very light gray silt. RESIDUUM		666
20												665
21												664
22												663
23												662
24		SPT 5	5 8 10	16/18						SAA; red (10YR 3/6); damp, very stiff, yellow silt bands (5YR 3/3), change to dark red and black. Quartz vein. 1 inch. RESIDUUM		661
25												660
26												659
27												658
28												657
29		SPT 6	5 8 9	15/18						SILT (ML); red (7.5YR 3/3), damp, very stiff, mica grains, non-plastic. RESIDUUM		656
30									ML	SILT (ML); yellow (7.5YR 6/6); damp, very stiff, rock structure evident in color bands. SAPROLITE		655
31												654
32												653
33												652
34		SPT 7	7 12 11	14/18						SAA; yellow (7.5YR 4/6); red (10R 3/6) mottled, damp, very stiff, sandy texture (<15 % sand). SAPROLITE		651
35												650
36												649
37												648
38												647
39		SPT 8	6 7 12	14/18						SAA; yellow (2.5Y 8/3); damp, very stiff, mottled with gray and red bands, some dark (black) bands		646
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1061

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										manganese inclusions. SAPROLITE		645
41												644
42												643
43												642
44		SPT 9	5 7 12	13/18						SAA; red (10R 4/4); damp, very stiff, red with yellow veins, 1 weathered quartz vein (0.5 inches), most yellow veins <1 mm thick, some black manganese oxide patches surrounded by yellow sand except within weathered quartz. SAPROLITE		641
45												640
46												639
47												638
48												637
49		SPT 10	5 9 12	17/18						SAA; red (10R 5/8) mottled with (2.5Y 5/4) or (2.5Y 7/4), very stiff,micaceous, manganese oxide, little to no sand, SAPROLITE	SPT refusal, boring terminated on 4/23/06	636
50												635
51												634
52												633
53												632
54												631
55												630
56												629
57												628
58												627
59												626
60												625
61												624
62												623
63												622
64												621
65												620
66												619
67												618
68												617
69												616
70												615
71												614
72												613
73												612
74												611
75												610
76												609
77												608
78												607
79												606
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1062**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1164027 E 1847313		Total Depth 40 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 621.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140.5 lbs / 30 inches	No. of Samples 8	Date Started 4/15/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/15/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									CL-ML	SILT, clayey (ML to CL), dark red (2.5YR 3/6); damp, stiff, low to medium plasticity, micaceous. RESIDUUM	Begin 4/15/06	621–619
4–5	✓	SPT 1	3 5 8	15.6/18								618–617
6–8									ML	SILT, trace sandy (ML) and trace clay; dark red (2.5YR 3/6) and strong brown (7.5YR 5/8); damp, medium stiff, mottled, micaceous, non-plastic to low plasticity, manganese oxide staining and quartz gravel veins at 8.8 ft. RESIDUUM		616–614
9–10	✓	SPT 2	3 3 5	13.2/18								613–612
11–13									ML	SILT (ML) with some clay; dark red (2.5YR 3/6) at 13.5 to 13.8 ft, then variegated yellowish-red (5YR 4/6) and light gray (5YR 7/1); damp, stiff, micaceous, non-plastic to low plasticity. SAPROLITE		611–610
14–15	✓	SPT 3	3 5 6	14.4/18								609–608
16–18												607–605
19–20	✓	SPT 4	3 5 7	15.6/18						SAA, variegated red (10YR 5/8), light brown (7.5YR 6/4), and light gray (7.5YR 7/1). SAPROLITE		604–603
21–23												602–599
24–25	✓	SPT 5	3 5 7	13.2/18						SAA, yellowish-brown (10YR 5/4). SAPROLITE		598–597
26–28												596–594
29–30	✓	SPT 6	2 4 4	16.8/18						SAA, strong brown (7.5YR 5/8) and olive brown (2.5YR 4/3). SAPROLITE		593–592
31–33												591–589
34–35	✓	SPT 7	2 3 5	18/18						SAA, with little more clay content; dark olive brown (2.5Y 3/3) with olive yellow (2.5Y 6/6); weathering along relict fracture traces, very micaceous, low plasticity. SAPROLITE.		588–587
36–38												586–584
39–40	✓	SPT 8	2 3 4	16.8/18						SAA, yellowish-brown (10YR 5/6).	Boring terminated at 40 ft on	583–582

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1062

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40											4/15/06	581
41												580
42												579
43												578
44												577
45												576
46												575
47												574
48												573
49												572
50												571
51												570
52												569
53												568
54												567
55												566
56												565
57												564
58												563
59												562
60												561
61												560
62												559
63												558
64												557
65												556
66												555
67												554
68												553
69												552
70												551
71												550
72												549
73												548
74												547
75												546
76												545
77												544
78												543
79												542
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1063**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Borrow Area CT 1 N 1165768 E 1845001		Total Depth 28.8 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 610.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 5/2/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/2/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML). FILL	Begin drilling 5/2/06 Drill clanking possible rock pieces	610–608
4–5		SPT 1	10 17 21	19.2 / 18					ML	SILT, sandy (ML); pale brown (10YR 6/3) to pale yellowish brown (10YR 6/4); damp, hard, >30% sand (fine), <10 % clay, some relict rock texture and manganese oxide veins (black) (subvertical). SAPROLITE		607–606
6–8												605–603
9–10		SPT 2	10 16 20	15.6 / 18	●	●	●			SILT, sandy (ML); brownish yellow (10YR 6/8) to yellowish brown (10YR 5/8); damp, hard, 26% sand, 74% fines. Remnant foliation, micaceous, manganese oxide veining (subvertical). SAPROLITE	100% return water	602–601
11–13												600–598
14–15		SPT 3	26 50/5	9.6 / 11	●	●	●			SILT, sandy (ML); light yellowish brown (2.5Y 6/4); 13% sand, 87% fines.		597–596
16–18												595–593
19–20		SPT 4	6 10 13	14.4 / 18						SILT, clayey (ML) dark yellowish brown (10YR 4/6), damp, very stiff, <15% sand (very fine), relict foliation manganese oxide veins (black). SAPROLITE		592–591
21–23												590–588
24–25		SPT 5	26 33 36	16.8 / 18						SILT, clayey (ML); light brownish gray (2.5Y 6/2); damp, hard, <10% sand (fine). SAPROLITE		587–586
26–27												585–584
28–29		SPT 6	50/3	1.2 / 3					ML	SILT (ML); white (5Y 8/1); damp. PARTIALLY WEATHERED ROCK	Tricone refusal at 28.8 ft. Boring terminated on 5/2/06	583–582
30–40												581–571

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1064**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Borrow Area CT 1 N 1166042 E 1845355		Total Depth 20 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 609.4 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 4	Date Started 5/2/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/2/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, sandy (ML); yellowish brown (10YR 5/4) to dark gray (5Y 4/1) to white (5Y 8/2); damp, stiff, 3% gravel, 38% sand, 59% fines. FILL	Begin 5/2/06	609
1												608
2												607
3												606
4		SPT 1	4 4 6	20.4/18	●	●	●					605
5												604
6												603
7												602
8												601
9		SPT 2	4 7 11	15.6/18	●	●	●		MH	SILT, sandy (MH); red (2.5YR 4/8) to yellowish brown (10YR 5/4); damp, very stiff, 23% sand, 77% fines. FILL		600
10												599
11												598
12												597
13												596
14		SPT 3	7 8 9	16.8/18	●	●	●		ML	SILT sandy with gravel (ML), strong brown (7.5YR 5/6), damp, very stiff, 7% gravel, 31% sand, 62% fines. FILL		595
15												594
16									ML	SILT, sandy (ML); white (5Y 8/1); dry, gravel sized fragments of quartz, very angular. PARTIALLY WEATHERED ROCK	Hard drilling, abundant rock fragments	593
17												592
18											100% water loss	591
19		SPT 4	50/5	6/5							Tricone refusal at 20 ft on 5/2/06, boring terminated	590
20												589
21												588
22												587
23												586
24												585
25												584
26												583
27												582
28												581
29												580
30												579
31												578
32												577
33												576
34												575
35												574
36												573
37												572
38												571
39												570
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1065**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Borrow Area CT 1 N 1165642 E 1845273		Total Depth 30 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 610.1 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Split Spoon	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 6	Date Started 5/2/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 5/2/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									SP-SM	SAND, silty with gravel (SP-SM); brown (7.5YR 5/4) to pinkish white (7.5YR 8/2); dry to damp, sand medium to coarse grained, 11% fines, 84% sand, 5% gravel (< 4 cm, subangular). FILL	Start 5/2/06 Hard drilling	610–607
4–5		SPT 1	27 22 10	18/18	●	●						606–605
6–8												604–602
8–9		SPT 2	8 11 14	18/18					ML	SILT, sandy (ML); reddish yellow (7.5YR 6/8), damp, <2% clay, manganese oxide veins (black, 2-3 mm thick) various orientations. RESIDUUM		601
10–13												600–597
14–15		SPT 3	6 8 10	17/18						SILT, sandy (ML); reddish yellow (7.5YR 6/8); 50% sand (very fine) 50% silt. RESIDUUM		596–595
16–18									ML	SILT, sandy (ML); olive (5Y 5/3 to 5Y 4/3) to dark yellowish brown, (10YR 4/6); damp, hard, sand 50% fine to medium grained , 50% silt low to medium plasticity, black manganese oxide veins. SAPROLITE		594–593
19–20		SPT 4	9 9 25	16/18								592–590
21–23												589–587
24–25		SPT 5	5 7 12	18/18						SILT, sandy (ML); light olive brown (2.5YR 5/4); damp, stiff, ~30% sand, fine to medium grained, no clay; micaceous. SAPROLITE		586–585
26–28									SM	SAND, silty (SM); pale yellow (2.5Y 7/4) to dark grayish brown (2.5Y 4/2), damp, medium dense, fine to medium sand, 40% silt, micaceous. SAPROLITE		584–582
29		SPT 6	9 13 14	18/18							No water encountered. Boring terminated at 30 ft on 5/2/06	581
30–40										Total Depth 30 ft. Borehole Grouted On 5/2/06		580–571

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1066**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163965 E 1847564		Total Depth 35 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 632.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140.5 lbs / 30 inches	No. of Samples 7	Date Started 4/14/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/14/06

Reviewed by / Date F. Syms 5/24/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, clayey (ML); mottled red (2.5YR 4/8), and reddish-yellow (7.5YR 6/8), damp to dry, medium stiff, low plasticity, micaceous. RESIDUUM	Begin 4/14/06	632
1												631
2												630
3												629
4		SPT 1	3 3 5	18/18								628
5										SILT (ML); variegated pinkish white (5YR 8/2) and yellowish red (5YR 4/6); dry, medium stiff, non-plastic, micaceous. RESIDUUM		627
6												626
7												625
8												624
9		SPT 2	2 2 3	16.5/18						SILT, clayey (ML); intervals of dark red (2.5YR 3/6) and strong brown (7.5YR 5/8); moist, medium stiff, manganese oxide. RESIDUUM		623
10												622
11												621
12												620
13												619
14		SPT 3	2 3 3	16.5/18						SAA strong brown (7.5YR 5/8). RESIDUUM		618
15												617
16												616
17												615
18												614
19		SPT 4	2 3 4	16.5/18					ML	SILT, clayey (ML), mottled very pale brown grains (10YR 7/8) and strong brown (7.5YR 5/8). SAPROLITE		613
20												612
21												611
22												610
23												609
24		SPT 5	3 3 6	13.2/18						SAA; with increasing very pale brown and manganese oxide staining. SAPROLITE		608
25												607
26												606
27												605
28												604
29		SPT 6	2 3 4	14.4/18						SAA.		603
30												602
31												601
32												600
33												599
34		SPT 7	3 4 5	13.2/18						SAA. SAPROLITE	Boring terminated on 4/14/06	598
35												597
36												596
37												595
38												594
39												593
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1067**	
Type and Diameter of Boring Wash Rotary / 3 inch	Boring Location Borrow Area 1 N 1163861 E 1847598		Total Depth 60 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 629 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140.5 lbs / 30 inches	No. of Samples 12	Date Started 4/18/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/18/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Begin 4/18/06	629
1												628
2												627
3												626
4		SPT 1	4 5 4	16.8/18						SILT (ML) with trace clay and trace sand; mottled, red (2.5YR 4/8) and reddish yellow (7.5YR 7/6); damp, stiff, micaceous, non-plastic. RESIDUUM		625
5												624
6												623
7												622
8												621
9		SPT 2	2 2 3	16.8/18						SILT, sandy (ML) with trace clay; varigated pink (7.5YR 7/3) and reddish yellow (7.5YR 6/8), variegated, damp, medium stiff, micaceous, non-plastic. RESIDUUM		620
10												619
11												618
12									ML	SILT, sandy (ML); variegated red (2.5YR 5/8), reddish-yellow (7.5YR 6/8), and white (7.5YR 8/1); damp to dry, stiff, micaceous, non-plastic. SAPROLITE		617
13												616
14		SPT 3	2 3 6	13.2/18								615
15												614
16												613
17									SM	SAND, silty (SM); intervals of light gray (2.5Y 7/1) and light olive brown (2.5Y 5/6); damp to dry, loose, micaceous. SAPROLITE		612
18												611
19		SPT 4	3 3 4	14.4/18								610
20												609
21												608
22												607
23												606
24		SPT 5	3 4 5	14.4/18						SAND, silty (SM); light gray (10YR 7/1) with yellow (10YR 8/8); damp, loose, weathering and manganese oxide staining (black) along relict fractures, micaceous, with quartz vein (gravel) at 23.5 ft. SAPROLITE		605
25												604
26												603
27									ML	SILT, sandy (ML); light gray (10YR 7/1) with yellow (10YR 8/8); damp, stiff, non-plastic. SAPROLITE		602
28												601
29		SPT 6	4 6 7	12/18								600
30												599
31												598
32												597
33												596
34		SPT 7	3 4 6	14.4/18						SILT (ML) with trace clay; light olive brown (2.5Y 5/6); damp, stiff, micaceous. SAPROLITE		595
35												594
36												593
37												592
38												591
39		SPT 8	3 5 6	15.6/18						SILT, sandy (ML) with trace clay; light olive brown (2.5Y 5/4) and yellow (2.5Y 7/8); damp, stiff,		590
40												589

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1067

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										micaceous. SAPROLITE		589
41												588
42												587
43												586
44		SPT 9	6 10 14	18/18						SAA, light olive brown (2.5Y 5/4); very stiff.		585
45												584
46												583
47												582
48												581
49		SPT 10	9 10 15	18/18						SAA; olive yellow (2.5Y 6/6) and light olive brown (2.5Y 5/6); relict rock fabric), moist to damp, very stiff, manganese oxide staining. SAPROLITE		580
50												579
51												578
52									SP-SM	SAND, silty (SP-SM); varigated yellowish brown (10YR 5/6) and gray (10YR 5/1); moist to damp, dense. SAPROLITE		577
53												576
54		SPT 11	7 15 23	15.6/18								575
55												574
56												573
57												572
58												571
59		SPT 12	8 12 15	18/18						SAA; some very pale brown (10YR 8/4); medium dense. SAPROLITE		570
60											Boring terminated at 60 ft on 4/18/106	569
61												568
62												567
63												566
64												565
65												564
66												563
67												562
68												561
69												560
70												559
71												558
72												557
73												556
74												555
75												554
76												553
77												552
78												551
79												550
80												549

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1068**	
Type and Diameter of Boring Wash Rotary / Tricone 4 inch	Boring Location Switchyard N 1164807 E 1847481		Total Depth 39 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 605.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 20	Date Started 8/20/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/20/06

Reviewed by / Date B. Reinicker 8/21/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT, sandy (ML); yellowish brown (10YR 5/6); dry to damp; stiff; ~75% silt, 20% very fine sand, trace subangular gravel. FILL	Begin 8/20/06	605
1		SPT 1	2 5 6	15/24								
2										SAA.		604
3		SPT 2	3 5 6	17/24								603
4										SAA; yellowish brown to reddish yellow (5YR 5/6).		602
5		SPT 3	2 5 5	4/24								601
6										SAA; red (2.5YR 4/6); thin clayey layers.		600
7		SPT 4	2 4 5	20/24								599
8										SAA; yellowish red (5YR 5/8).		598
9		SPT 5	2 6 7	19/24								597
10										SAA; 10% gravel, 75% fines.	Lab data from B-1068-UD, UD-2 at 10 to 12 ft	596
11		SPT 6	2 4 6	19/24								595
12										SAA.		594
13		SPT 7	2 6 7	15/24						SAA; red (2.5YR 4/6); more clay rich layer 60% silt, 30% clay, 10% sand.		593
14												592
15		SPT 8	2 3 3	20/24					SP	SAND, (SP); yellowish red (5YR 5/8); wet; loose; medium sand. FILL		591
16									SM	SAND silty (SM); yellowish brown (10YR 5/6); damp; medium dense; mostly fine sand. FILL		590
17		SPT 9	3 5 8	19/24						SAA; alternating with layers of SILT clayey with sand (ML); red (2.5YR 4/6) from 15.3 to 17 ft.		589
18												588
19		SPT 10	6 11 14	16/24								587
20										SAA; with alternating silt layers. FILL		586
21		SPT 11	3 5 7	20/24								585
22										SAA. FILL		584
23		SPT 12	4 6 9	16/24								583
24										SAA; gravels up to 0.4 inch; very fine sand. FILL	B-1068-UD, UD-4 at 24 to 26 ft had 9% gravel, 65% fines, was (ML)	582
25		SPT 13	5 6 7	10/24								581
26										SAA; loose.		580
27		SPT 14	1 2 4	10/24								579
28										SAA.		578
29		SPT 15	3 4 6	20/24								577
30												576

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1068

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
30												575
31		SPT 16	2 6 6	20/24						SAND silty (SM); yellowish brown (10YR 5/6); damp; medium dense; mostly fine sand. FILL *(Continued from previous page)* SAND, silty (SM); yellowish brown (10YR 5/6); damp; medium dense; ~60% very fine sand; 40% fines; trace gravels. SAA; poor recovery due to quartz gravel.		574
32												573
33		SPT 17	3 5 6	7/24								572
34												571
35		SPT 18	2 3 5	11/24					SM	SAND, silty (SM); alternating dark yellowish brown (10YR 4/4) and speckled light gray (10YR 7/2); damp; loose. SAPROLITE		570
36												569
37		SPT 19	3 4 5	16/24					SM	SAND, silty (SM); yellowish red (5YR 4/6) to reddish gray (5YR 5/2); damp; loose. SAPROLITE		568
38		SPT 20	50/2	0/2						No recovery. PARTIALLY WEATHERED ROCK	Tricone refusal at 39 ft on 8/20/06; boring terminated	567
39												566
40												565
41												564
42												563
43												562
44												561
45												560
46												559
47												558
48												557
49												556
50												555
51												554
52												553
53												552
54												551
55												550
56												549
57												548
58												547
59												546
60												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1068-UD**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Switchyard N 1164805 E 1847471		Total Depth 32 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 605.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 5	Date Started 8/23/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/23/06

Reviewed by / Date B. Reinicker 10/5/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled without sampling 0 to 6 ft	605
1												604
2												603
3												602
4												601
5												600
6											Shelby push 6 to 8 ft	599
7		UD 1		18/24					SM	SAND, silty (SM).		598
8											Drilled without sampling 8 to 10 ft	597
9												596
10											Shelby push 10 to 12 ft	595
11		UD 2		19.5/24	●	●	●		ML	SILT, sandy (ML); 10% gravel, 15% sand, 75% fines.		594
12											Drilled without sampling 12 to 16 ft	593
13												592
14												591
15												590
16											Shelby push 16 to 18 ft	589
17		UD 3		17.5/24					SM	SAND, silty (SM).		588
18											Drilled without sampling 18 to 24 ft	587
19												586
20												585
21												584
22												583
23												582
24											Shelby push 24 to 26 ft	581
25		UD 4		22/24	●	●	●		ML	SILT, sandy (ML); 9% gravel, 26% sand, 65% fines.		580
26											Drilled without sampling 26 to 30 ft	579
27												578
28												577
29												576
30									SM	SAND, silty (SM).	Shelby push 30 to 32 ft	575
31		UD 5		17/24							Boring terminated on 8/23/06	574
32												573
33												572
34												571
35												570
36												569
37												568
38												567
39												566
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1069**	
Type and Diameter of Boring Wash Rotary / Tricone 4 inch	Boring Location Switchyard N 1164802 E 1847447		Total Depth 40 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 604.9 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 20	Date Started 8/19/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/19/06

Reviewed by / Date B. Reinicker 8/21/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Unsampled gravels.	Begin on 8/19/06	
1		SPT 1	4 5 4	17/24					ML	SILT, sandy, clayey (ML); yellowish red (5YR 5/6); dry; stiff to very stiff; trace gravels up to 1 inch diameter; fine sands. FILL		604
2												603
3		SPT 2	6 7 12	21/24						SAA; yellowish brown (10YR 5/8). FILL		602
4												601
5		SPT 3	3 5 7	7/24								600
6										SAA; yellowish red (5YR 5/6); damp. FILL		599
7		SPT 4	2 3 5	19/24						SAA; strong brown (7.5YR 5/6) to yellowish red (5YR 5/6).		598
8												597
9		SPT 5	3 4 7	18/24								596
10												595
11		SPT 6	3 7 8	19/24						SAA with some pieces of weathered diorite and granodiorite (~1.5 inch across).		594
12												593
13		SPT 7	3 4 7	14/24					SP	SAND, clayey, silty (SP); yellow (2.5Y 7/4); damp; medium dense.		592
14									ML			591
									SP	SILT, sandy, clayey (ML) strong brown (2.5YR 5/6) to yellowish red (5YR 5/6).		
15		SPT 8	1 1 3	8/24					ML			590
									SP	SAND, clayey, silty (SP); yellow (2.5Y 7/4); damp; soft.		
16									SM	SILT, sandy, clayey (ML), soft; strong brown (2.5YR 5/6) to yellowish red (5YR 5/6).		589
17		SPT 9	2 4 5	18/24						SAND, clayey, silty (SP); yellow (2.5Y 7/4); damp; soft.		588
18										SILT, sandy, clayey (ML); yellowish red (5YR 5/6); damp; stiff; and SAND silty, clayey (SM); pale yellow (2.5Y 7/4); damp; medium dense; saprolite-fragments; both with trace gravels up to 1 inch diameter. FILL		587
19		SPT 10	3 5 6	20/24								586
20												585
21		SPT 11	3 6 7	15/24					SM	SAND, silty, clayey (SM); light yellowish brown (10YR 6/4); damp; medium dense; fine sand; laminated appearance; micaceous; trace gravels. FILL		584
22												583
23		SPT 12	3 6 8	15/24						SAA.		582
24												581
25		SPT 13	1 2 5	11/24						SAA; loose; some meta-granodiorite pieces just above 26 ft depth. FILL		580
26												579
27		SPT 14	2 5 5	21/24						SAA; some siltier layer, slightly darker, yellowish brown (10YR 5/4).		578
28												577
29		SPT 15	2 4 5	20/24						SAA.		576
30												575

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1069

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
30									SM	SAND, silty, clayey (SM); light yellowish brown to yellowish brown (10YR 5.5/4); damp to moist; loose; micaceous; laminated appearance; trace gravels up to 1 inch diameter. FILL		574
31		SPT 16	2 4 4	15/24								
32										SAA; more silt ~35%; FILL.		573
33		SPT 17	1 3 5	16/24								572
34										SAA.		571
35		SPT 18	2 4 6	11/24								570
36										SAA.		569
37		SPT 19	2 7 9	14/24								568
38										Quartz gravels (subangular up to 0.5 inch). FILL		567
39		SPT 20	4 5 6	22/24					ML	SILT, sandy, clayey (ML); red (2.5YR 4/6); damp; stiff; micaceous; laminated. FILL	End of drilling on 8/19/06; boring terminated at 40 ft	566
40												565
41												564
42												563
43												562
44												561
45												560
46												559
47												558
48												557
49												556
50												555
51												554
52												553
53												552
54												551
55												550
56												549
57												548
58												547
59												546
60												545

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1070**	
Type and Diameter of Boring Wash Rotary / Tricone 4 inch	Boring Location Cooling Tower N 1165725 E 1848283		Total Depth 106 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 610.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 50	Date Started 8/17/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/19/06

Reviewed by / Date B. Reinicker 8/21/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–1		SPT 1	5 12 7	16/24						Gravel fill, no sample collected.	Start 8/17/06	610
2–3		SPT 2	5 7 8	17/24					ML	SILT clayey (ML); red (2.5YR 5/8); dry to damp; very stiff; trace gravel up to 1.2 inch diameter (sub-angular); trace fine to very fine sand. FILL		609 608
4–5		SPT 3	2 6 7	1/24						SAA; red (2.5YR 5/8); stiff		607 606
6–7		SPT 4	5 6 7	17/24						SILT sandy, clayey (ML); light yellowish brown (10YR 6/4); more very fine sand		605 604
8–9		SPT 5	3 5 6	16/24						SAA; red (2.5YR 5/8)	Lab data from B-1070-UD, UD-2 9 to 11 ft	603 602 601
10–11		SPT 6	3 5 6	18/24						SAA; alternating layers of light yellowish brown and red; 10% gravel, 57% fines		600
12–13		SPT 7	3 5 7	10/24						SAA		599 598
14–15		SPT 8	2 4 7	15/24								597 596
16–17		SPT 9	3 6 7	16/24						SILT sandy, clayey and gravels (ML); alternating bands of red (2.5YR 5/8) and light yellowish brown (10 YR 6/4); stiff to very stiff; damp; sand mostly fine; sub angular gravels up to 1.2 inch diameter; FILL		595 594
18–19		SPT 10	3 10 11	18/24						SAA	B-1070-UD, UD-4, 19 to 21 ft	593 592
20–21		SPT 11	3 8 8	4/24						Increased sand content from 19.4 to 19.6 ft 23% gravel, 29% fines		591 590
22–23		SPT 12	3 5 6	21/24						SAA; red (2.5YR 5/8).		589 588
24–25		SPT 13	2 5 6	17/24						SAA; laminated in light yellowish brown layers. FILL		587 586
26–27		SPT 14	2 6 9	9/24						SAA; red (2.5YR 5/8).		585 584
28–29		SPT 15	5 5 7	21/24						Thin layer of fine sand SAA; light yellowish brown (10YR 6/4)	B-1070-UD, UD-6 at 29 to 31 ft	583 582 581
30												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1070

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
30												580
31		SPT 16	5 5 5	0/24						No recovery; 4% gravel, 59% fines. FILL		579
32												578
33		SPT 17	3 6 10	19/24						SILT, sandy, clayey with gravels (ML); alternating bands of red (2.5YR 5/8); and light yellowish brown (10YR 6/4); stiff to very stiff; damp; sand mostly fine; clay; 5% sub angular gravels up to 1.2 inch diameter		577
34												576
35		SPT 18	4 7 8	19/24						SAA; light yellowish brown.		575
36												574
37		SPT 19	3 5 6	16/24						SAA; light yellowish brown.		573
38												572
39		SPT 20	4 10 12	14/21						SAA; reddish yellow (7.5YR 6/6). Layer of higher gravel content, gravels composed of weathered meta-granodiorite from 38.8 to 41.4 ft		571
40											End of day 8/17/06 Begin day 8/18/06; water at 0 ft	570
41		SPT 21	2 5 12	15/24					ML	SAA; red (2.5YR 5/8), very pale brown (10YR 7/3) from 41.4 to 41.8 ft., increased sand content. FILL		569
42										SAA; red (2.5YR 5/8)		568
43		SPT 22	4 11 12	7/24								567
44												566
45		SPT 23	5 6 11	14/24						SAA; yellowish red (5YR 5/6); 2% gravel, 57% fines.	B-1070-UD, UD-8 at 44 to 45.6 ft	565
46												564
47		SPT 24	4 8 9	20/24						SILT, sandy, clayey and gravels (ML); red (2.5YR 3/8) to yellowish red (5YR 4/6); laminated appearance, damp; stiff to very stiff; sand mostly fine, 5% sub-angular gravels up to 1.2 inch diameter. FILL		563
48												562
49		SPT 25	5 6 10	19/24						More clay rich layer 46.4 to 46.8 ft		561
50												560
51		SPT 26	3 6 6	19/24								559
52												558
53		SPT 27	4 5 8	16/24						SAA; light brown (7.5YR 6/4).		557
54												556
55		SPT 28	2 6 7	8/24						SAA; yellowish red (7.5YR 6/6).		555
56												554
57		SPT 29	2 8 11	15/24						SAA; yellowish red (7.5YR 6/6).		553
58												552
59		SPT 30	3 6 10	21/24						SAA; brown (7.5YR 5/4). FILL.		551
60												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1070

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
60												550
61		SPT 31	6 11 13	6/24						SILT sandy, clayey and gravels (ML); brown (7.5YR 5/4) to yellowish red (5YR 4/6); laminated appearance; moist; stiff to very stiff; ~55% silt, 30% fine sand; 10% clay, 5% sub-angular gravels up to 1.2 inch diameter. FILL		549
62										Damp from 62 to 64 ft		
63		SPT 32	8 8 13	15/24								548
64												547
65		SPT 33	3 5 7	20/24						SAA; yellowish red with light yellowish brown (10YR 6/4) from 64.9 to 65.3 ft.		546
66												545
67		SPT 34	2 6 9	17/24						Yellowish red (no gravels); moist from 66.4 to 67 ft.		544
68												543
69		SPT 35	1 5 7	12/24						Yellowish red (no gravels); damp at 68 to 70 ft.		542
70												541
71		SPT 36	4 7 9	22/24						SAA.		540
72												539
73		SPT 37	5 10 11	17/24						SAA; yellowish red (5YR 4/6) some small gravels/coarse sand		538
74												537
75		SPT 38	2 2 7	24/24						SAA; gravels present; wet between 74.8 and 75.3 ft. FILL		536
76												535
77		SPT 39	4 6 9	22/24						SAA; with some mottled color variations; damp; stiff to very stiff; 55% silt, 30% fine sand; 10% clay; 5% sub-angular gravels up to 1.2 inch diameter; laminated. FILL		534
78												533
79		SPT 40	6 8 11	16/24						SAA; brown (7.5YR 5/4).		532
80										Thin clay rich layer.		531
81		SPT 41	6 7 12	7/24					ML	SAA; red (2.5YR 4/8); moist. FILL		530
82												529
83		SPT 42	2 9 13	18/24						SAA; strong brown (7.5YR 5/6); from 82.9 to 83.4 ft		528
84												527
85		SPT 43	2 8 11	14/24						SAA; red (2.5YR 4/8) FILL		526
86												525
87		SPT 44	5 10 12	21/24					SM	SAND silty, clayey and gravels (SM); strong brown (7.5YR 5/6); moist; medium dense; some small gravels <5%; fine to very fine sand; 20% silt; 5% clay. FILL		524
88										SAA		523
89		SPT 45	2 7 10	17/24								522
90												521

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1070

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
90												520
91		SPT 46	5 8 10	19/24						SAND, silty (SM); strong brown (7.5YR 4/6); with some color variations; moist; medium dense; subangular gravels up to 1 inch diameter (<5%); ~75% fine sand; 20% silt; 5% clay. FILL		519
92												518
93		SPT 47	3 13 17	15/24					SM	SAND silty, clayey and gravels (SM); light greenish gray (5G 7/1); medium dense to dense; damp; sub angular quartz gravels up to 1.2 inch diameter; ~60% fine sand; 25% silt; 10% clay; 5% quartz gravels. RESIDUUM		517
94												516
95		SPT 48	6 8 16	18/24								515
96										SAND silty, clayey and gravels (SM); light greenish gray (5G 7/1); with salt and pepper appearance; damp; dense; brownish yellow oxidation staining (10YR 6/8); sub-angular quartz gravels; ~60% fine sand; 25% silt; 10% clay; 5% quartz gravels; micaceous. SAPROLITE		514
97		SPT 49	5 13 26	21/24								513
98												512
99		SPT 50	9 19 22	16/24								511
100											End of day 8/18/06 Begin day 8/19/06 Drilled without sampling 100 to 106 ft	510
101												509
102												508
103												507
104												506
105												505
106											Tricone refusal at 106 ft; boring terminated on 8/19/06	504
107												503
108												502
109												501
110												500
111												499
112												498
113												497
114												496
115												495
116												494
117												493
118												492
119												491
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1070-UD**	
Type and Diameter of Boring Wash Rotary / Tricone 4 inch	Boring Location Cooling Tower N 1165720 E 1848293		Total Depth 57.7 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 610.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Undisturbed	Sample Driving Hammer/Drop NA / NA	No. of Samples 11	Date Started 8/21/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/22/06

Reviewed by / Date B. Reinicker 8/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Start 8/21/06	610
1											Drilled without sampling 0 to 4 ft	609
2												608
3												607
4		UD 1		18/24					ML	SILT (ML).	Shelby push 4 to 6 ft	606
5												605
6									SM	SAND, silty (SM).	Drilled without sampling 6 to 9 ft	604
7												603
8												602
9		UD 2		18/24	●	●	●		ML	SILT, sandy (ML); 10% gravel, 33% sand, 57% fines.	Shelby push 9 to11 ft	601
10											End day 8/21/06 Begin day 8/22/06	600
11											Drilled without sampling 11 to 14 ft	599
12												598
13												597
14		UD 3		19/24					SM	SAND, silty (SM).	Shelby push 14 to 16 ft	596
15												595
16											Drilled without sampling 16 to 19 ft	594
17												593
18												592
19		UD 4		12/24	●	●	●		SM	SAND, silty (SM); 23% gravel, 47% sand, 29% fines.	Shelby push 19 to 21 ft	591
20												590
21											Drilled without sampling 21 to 24 ft	589
22												588
23												587
24		UD 5		15/24					ML	SILT, sandy (ML).	Shelby push 24 to 26 ft	586
25												585
26											Drilled without sampling 26 to 29 ft	584
27												583
28												582
29		UD 6		15/24	●	●	●		ML	SILT, sandy (ML); 4% gravel, 37% sand, 59% fines.	Shelby push 29 to 31 ft	581
30												580
31											Drilled without sampling 31 to 34 ft	579
32												578
33												577
34		UD 7		18.5/24					SM	SAND, silty (SM).	Shelby push 34 to 36 ft	576
35												575
36											Drilled without sampling 36 to 44 ft	574
37												573
38												572
39												571
40												

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1070-UD

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												570
41												569
42												568
43												567
44												566
45		UD 8		17/20	●	●	●		ML	SILT, sandy (ML); 2% gravel, 41% sand, 57% fines.	Shelby push 44 to 45.6 ft	565
46											Drilled without sampling 45.6 to 49 ft	564
47												563
48												562
49									ML	SILT, sandy (ML).	Shelby push 49 to 51 ft	561
50		UD 9		16.5/24								560
51									SM	SAND, silty (SM).	Drilled without sampling 51 to 54 ft	559
52												558
53												557
54											Shelby push 54 to 56 ft	556
55		UD 10		15/24					SM	SAND, silty (SM).		555
56											Shelby push 56 to 57.7 ft	554
57		UD 11		8/20					SM	SAND, silty (SM).		553
58											Boring terminated 8/22/06	552
59												551
60												550
61												549
62												548
63												547
64												546
65												545
66												544
67												543
68												542
69												541
70												540
71												539
72												538
73												537
74												536
75												535
76												534
77												533
78												532
79												531
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1071**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location Cooling Tower N 1165707 E 1848320		Total Depth 100 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 610.5 feet MSL	Ground Water Depth 6.5 feet	Depth to Bedrock N/A
Sampling Method	Sample Driving Hammer/Drop	No. of Samples	Date Started 8/16/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/17/06

Reviewed by / Date B. Reinicker 8/21/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Gravels; no sample collected	Begin 8/16/06	610
1		SPT 1	2 8 3	14/24					ML	SILT clayey (ML); red (2.5YR 4/6); damp; stiff; ~70% silt, ~30% clay; FILL		609
2												
3		SPT 2	5 7 8	12/24						SAA; red (2.5YR 5/6); mottled appearance with trace fine sands; clay ~10%; micaceous; low plasticity; FILL		608
4												607
5		SPT 3	5 7 8	9/24								606
6												605
7		SPT 4	3 4 5	19/24					▽	SAA; brownish yellow (10YR 6/6); FILL		604
8												603
9		SPT 5	3 5 6	18/24						SAA; red (2.5YR 4/6); with trace gravels; up to 1.5 inch diameter. FILL		602
10												601
11		SPT 6	4 6 7	20/24						SAA; slightly more clay-rich layer ~30% clay from 10 to 11 ft. SAA; red (2.5YR 4/6) and brownish yellow (10YR 6/6); 3 to 4 inch lifts. FILL		600
12												599
13		SPT 7	3 4 7	17/24						SILT, sandy (ML); yellowish brown (10YR 5/4); damp; stiff; gravels up to 1 inch from 12.6 to 13 ft		598
14										SILT, clayey (ML); red (2.5YR 4/6); damp; stiff; alternating with ~4 inch layers of brownish yellow, SILT sandy, and gravels		597
15		SPT 8	4 7 7	18/24								596
16												595
17		SPT 9	3 6 8	20/24						SILT, clayey (ML); alternating bands of red (2.5YR 5/6) and brownish yellow (10YR 6/6); damp; stiff; with fine to medium sands and trace gravels; ~10% clay; gravels average ~1 inch diameter; becomes micaceous. FILL		594
18												593
19		SPT 10	4 8 7	20/24						SAA; brownish yellow to 19.4 ft, then red. FILL		592
20												591
21		SPT 11	2 2 5	10/24						SAA; red (2.5 YAR 5/6); medium stiff. FILL		590
22												589
23		SPT 12	2 5 6	7/24						SAA; yellowish red layer (5YR 4/6); moist; stiff. FILL		588
24												587
25		SPT 13	7 7 9	12/24						SAA; red (2.5YR 5/6) from 25.8 ft down; very stiff. FILL		586
26												585
27		SPT 14	3 7 9	20/24						SAA; alternating red and brownish yellow below. FILL		584
28												583
29		SPT 15	4 7 8	17/24						SAA; stiff; thin gray layer from 29.8 to 29.9 ft. FILL		582
30												581

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1071

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
30									ML	SAA; reddish yellow (7.5YR 6/6); moist to damp; stiff; with fine to medium sands; trace gravels up to 1 inch diameter; ~10% clay; micaceous; mottled with brownish gray (10 YR 6/2) from 30.5 to 31 ft		580
31		SPT 16	3 6 7	23/24						SAA; no gravels, trace sands		579
32										Thin greenish gray layer (10BG 6/1) from 33.1 to 33.3 ft		578
33		SPT 17	4 7 7	19/24						SAA; red (7.5YR 4/6); to 35.3 ft, then light yellowish brown (10YR 6/4). FILL		577
34										SAA; very stiff; with fine lamination in fill material; FILL		576
35		SPT 18	2 6 8	15/24						SAA; yellowish red (5YR 5/6) with fine lamination		575
36										SAA; alternating red and light yellowish brown layers. FILL		574
37		SPT 19	4 8 10	23/24						SAA; alternating layers of red (2.5YR 4/8) and mottled brown (7.5YR 5/3); damp; stiff. FILL		573
38										SILT clayey and trace sand (ML); alternating layers of red (2.5YR 4/8) and brown (7.5YR 5/3); damp; very stiff; trace gravel up to 1.5 inch diameter; sub angular; micaceous. FILL		572
39		SPT 20	5 7 12	4/24						SAA; stiff. FILL		571
40										SAA; with reddish yellow (7.5YR 6/6); clayish layer from 51.8 to 51.9 ft. FILL		570
41		SPT 21	6 10 11	13/24						SAA; very stiff; fine to medium grained; ~10% sand. FILL		569
42										SAA; stiff.		568
43		SPT 22	2 11 15	15/24						SAA; light brown (7.5YR 6/3); moist; light brown (gravel); low plasticity. FILL		567
44										SAA; more gravel from 58.7 ft down; ~5% coarse sand/small gravel. FILL		566
45		SPT 23	2 3 8	13/24								565
46												564
47		SPT 24	4 9 9	18/24								563
48												562
49		SPT 25	3 4 6	18/24								561
50												560
51		SPT 26	2 6 9	12/24								559
52												558
53		SPT 27	4 8 9	21/24								557
54												556
55		SPT 28	3 5 8	13/24								555
56												554
57		SPT 29	6 10 10	7/24								553
58												552
59		SPT 30	4 9 12	22/24								551
60												

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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1071

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
60									ML	SAA; yellowish brown (10YR 5/4); damp to moist; very stiff; micaceous; gravel sub angular (mostly quartz); up to 0.8 inch diameter; ~5 to 10% coarse sand and gravel; >10% clay; low plasticity. FILL		550
61		SPT 31	4 8 12	17/24								549
62										SAA; moist; very micaceous; no gravels or coarse sand. FILL		548
63		SPT 32	5 13 14	4/24								547
64										SAA; reddish brown (5YR 5/4) to brown (7.5YR 5/4); damp; ~5% medium sand. FILL		546
65		SPT 33	4 10 12	19/24								545
66										SAA; yellowish red (5YR 5/8). FILL		544
67		SPT 34	4 6 7	22/24								543
68										SAA; some olive green layers at 68.8 ft. FILL		542
69		SPT 35	4 11 12	18/24								541
70										SAA; red (2.5YR 5/6). FILL		540
71		SPT 36	4 10 10	19/24								539
72										SAA. FILL		538
73		SPT 37	4 9 11	18/24								537
74												536
75		SPT 38	6 7 13	17/21						SILT, clayey, sandy (ML); red (2.5YR 5/6); damp; very stiff; ~10% clay, ~5% fine to medium sand; trace gravels; micaceous; low to medium plasticity. FILL		535
76												534
77		SPT 39	5 11 14	20/24						Highly weathered meta-granodiorite fragments from 77.6 to 77.9 ft.		533
78												532
79		SPT 40	4 7 8	21/24								531
80										SAA; red to reddish yellow (2.5YR 6/8); no gravels. FILL	End of day 8/16/06 Begin day 8/17/06; water level at 6.5 ft	530
81		SPT 41	6 9 14	22/24								529
82										SAA; zone of high gravel/coarse sand content (~40%); angular clasts up to 1.2 inch diameter, average coarse sand size from 82.3 to 83.1 ft		528
83		SPT 42	2 8 11	20/24						SAA; red to reddish yellow (2.5YR 6/3); with trace gravels. FILL		527
84										SAA; red (2.5YR 5/6), stiff. FILL		526
85		SPT 43	3 5 9	14/24								525
86										SAA; more reddish brown (7.5YR 4/4); very stiff; sand increase to ~15% (fine sand). FILL		524
87		SPT 44	3 7 9	11/24								523
88												522
89		SPT 45	4 10 10	24/24								521
90									SM			

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1071

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
90										SAND silty, clayey (SM); light greenish gray (10GY 5/1); damp; medium dense; ~60% very fine sand, ~30% silt, ~10% clay; yellow oxidation staining; root pieces; RESIDUUM *(Continued from previous page)* SAA; trace gravels up to 1.2 inch diameter, average 0.5 inch diameter; mostly quartz, some mafics angular to sub-angular SAA; very gravel rich from 93.8 to 94 ft. RESIDUUM SAA; gravel percentage increasing with depth; sand component becomes coarser. RESIDUUM		520
91		SPT 46	5 8 8	18/24								519
92												518
93		SPT 47	4 4 8	8/24								517
94												516
95		SPT 48	2 5 9	8/24								515
96												514
97		SPT 49	2 3 4	16/24					ML	SILT clayey (ML); dark yellowish brown (10YR 4/4); damp to moist; medium stiff; very micaceous. SAPROLITE SAA; SAPROLITE		513
98												512
99		SPT 50	2 4 5	20/24							Boring terminated on 8/17/06	511
100										Total Depth 100 ft. Groundwater encountered at 6.5 feet Borehole Grouted On 8/19/06		510
101												509
102												508
103												507
104												506
105												505
106												504
107												503
108												502
109												501
110												500
111												499
112												498
113												497
114												496
115												495
116												494
117												493
118												492
119												491
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1072**	
Type and Diameter of Boring Wash Rotary / Tricone 2 7/8 inch	Boring Location Borrow Area N 1164001 E 1847171		Total Depth 45 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 630.2 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 8/21/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/21/06

Reviewed by / Date B. Reinicker 8/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Start drilling 8/21/06	630
1												629
2												628
3												627
4	✓	SPT 1	2 4 7	14/18						SILT, clayey (ML); red (2.5Y 4/8); dry to damp; stiff; 80% silt, 20% clay. RESIDUUM		626
5												625
6												624
7												623
8												622
9	✓	SPT 2	1 3 3	12/18						SILT, sandy, clayey (ML); yellowish red (5YR 5/8); to red (10R 5/6); dry to damp; medium stiff; ~60% silt, 30% very fine sand; ~10% clay. RESIDUUM		621
10												620
11												619
12												618
13												617
14	✓	SPT 3	2 3 3	12/18								616
15									ML	SILT, clayey, sandy (ML); brownish yellow (10YR 6/6); damp; medium stiff; black lenses of manganese oxide oriented at 35° (relict rock texture); ~70% silt, ~20% clay, ~10% fine sand. SAPROLITE		615
16												614
17												613
18												612
19	✓	SPT 4	1 3 3	16/18								611
20												610
21												609
22												608
23												607
24	✓	SPT 5	1 3 5	13/18						SAA; mottled strong brown (7.5YR 5/8). SAPROLITE		606
25												605
26												604
27												603
28												602
29	✓	SPT 6	1 3 2	18						SAA.		601
30												600
31												599
32												598
33												597
34	✓	SPT 7	1 3 3	21/18						SAA; brownish yellow (10YR 6/8). SAPROLITE		596
35												595
36												594
37												593
38												592
39	✓	SPT 8	1 3 5	17/18						SAA.		591
40												

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SOIL LOG - Boring No. B-1072

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												590
41												589
42												588
43												587
44		SPT 9	7 15 40/4	16/16						SAA; light olive brown (2.5Y 5/4); more micaceous; manganese oxide veins. SAPROLITE	Tricone refusal at 45 ft on 8/21/06; boring terminated	586
45												585
46												584
47												583
48												582
49												581
50												580
51												579
52												578
53												577
54												576
55												575
56												574
57												573
58												572
59												571
60												570
61												569
62												568
63												567
64												566
65												565
66												564
67												563
68												562
69												561
70												560
71												559
72												558
73												557
74												556
75												555
76												554
77												553
78												552
79												551
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1073**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Borrow Area N 1163676 E 1847239		Total Depth 78.5 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 626.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock 42 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 8	Date Started 8/20/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/21/06

Reviewed by / Date B. Reinicker 8/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Start 8/20/06	626
1												625
2												624
3												623
4		SPT 1	1 3 3	7/18						SILT, sandy, clayey (ML); red (2.5YR 4/6) and brownish yellow (10YR 6/6); damp; medium stiff; micaceous. RESIDUUM		622
5												621
6												620
7												619
8												618
9		SPT 2	2 3 3	10/18								617
10										SAA.		616
11												615
12												614
13												613
14		SPT 3	2 3 3	9/18						SAA; brownish yellow (10YR 6/6).		612
15												611
16												610
17									ML	SILT, sandy (ML); light yellowish brown (2.5Y 6/4); damp; medium stiff; micaceous; ~60% silt, ~40% fine sand. SAPROLITE		609
18												608
19		SPT 4	2 3 4	11/18								607
20												606
21												605
22												604
23												603
24		SPT 5	2 4 5	13/18								602
25												601
26												600
27												599
28												598
29		SPT 6	3 5 8	16/18						SAA; light yellowish brown to brownish yellow (10YR 6/8); original veining and fracture in parent rock. SAPROLITE		597
30												596
31												595
32									SM	SAND, silty (SM); yellow (2.5Y 7/6); dry to damp; very dense; micaceous ~40% silt. SAPROLITE		594
33												593
34		SPT 7	6 20 39	12/18								592
35												591
36												590
37												589
38												588
39		SPT 8	9 12 20	15/18								587
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. B-1073

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40									ML	SILT, sandy (ML); light yellowish brown (2.5Y 6/4); damp; hard; micaceous. SAPROLITE	Tricone refusal at 42 ft on 8/20/06, see rock log	586
41												585
42												584
43												583
44												582
45												581
46												580
47												579
48												578
49												577
50												576
51												575
52												574
53												573
54												572
55												571
56												570
57												569
58												568
59												567
60												566
61												565
62												564
63												563
64												562
65												561
66												560
67												559
68												558
69												557
70												556
71												555
72												554
73												553
74												552
75												551
76												550
77												549
78												548
79												547
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1073**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location Borrow Area N 1163676 E 1847239		Total Depth 78.5 feet
Drilling Contractor and Rig MACTEC/Banks/337153 / CME 550 X	Elevation and Datum 626.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock 42 feet
Casing Size and Depth 3.5 inch / 42 feet	Length of Core Barrel and Bit 13.5 feet	No. of Core Boxes 2	Date Started 8/20/06
	Borehole Inclination -90	Logged by G. Maximov	Date Completed 8/21/06

Reviewed by / Date B. Reinicker 8/23/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
42–78		1	4.1/6.5	0	MW	R2 to R3		META-GRANODIORITE; light brownish gray (2.5Y 6/2); medium grained; equigranular; oxidation staining.	8/20/06 begin NQ coring	584–549
49–52		2	2.8/4.0	0	MW SW to F	R2 to R3 R4		SAA; bluish gray (5PB 5/1)		578–575
53		3	1.0/1.0	40	SW to F	R4			Hard drilling	574
54–56		4	2.8/3.0	12	HW HW HW to MW MW	R0 R2 R3 R3		Friable layer, thin (~0 to 2 inch) SAA; fine to medium grained	100% water loss	573–571
57–58		5	2.0/2.0	35	SW to MW SW to MW	R4 R3		META-GRANODIORITE		570–569
59–62		6	4.8/5.0	67	SW to MW F	R3 R4 to R5		Change in weathering to fresh. CONTINUOUS ROCK. SAA; slightly darker to bluish gray (5PB 5/1)		568–565
63–64		7	1.2/1.2	100	F	R4 to R5		SAA; calcite veining	End of day 8/20/06 Begin day 8/21/06	564–563
65–68		8	3.7/3.7	97	F	R4 to R5		SAA.		562–559
69–70		9	2.3/2.3	100	F	R4 to R5		SAA; pervasive calcite veining		558–557
71–73		10	2.7/2.8	100	F	R4 to R5		SAA. META-GRANODIORITE		556–554
74–78		11	4.9/5.0	98	F	R4 to R5		SAA.		553–549
79–82									End drilling 8/21/06, boring terminated	548–545

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1074**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch	Boring Location Unit 1 N 1166070 E 1846246		Total Depth 67.5 feet
Drilling Contractor and Rig MACTEC/Warren/211797 / CME 75	Elevation and Datum 569.2 feet MSL	Ground Water Depth 21.1 feet	Depth to Bedrock 31.5 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 9	Date Started 3/5/07
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/9/07

Reviewed by / Date M. Gray 3/29/07

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML		Begin drilling at 1:30 pm 3.25 inch hollow augering with center bit	569
1												568
2												567
3												566
4		SPT 1	1 1 2	0/18					ML	SILT, sandy (ML), yellowish brown (10YR 5/8), to yellowish red (5YR 4/6), moist, soft, nonplastic, micaceous FILL	No recovery from split spoon	565
5												564
6												563
7												562
8												561
9		SPT 2	1 2 2	5/18					ML	SILT, sandy (ML), yellowish brown (10YR 5/6), moist, soft, ~ 20% fine sand, 10% fine gravel FILL		560
10												559
11												558
12												557
13												556
14		SPT 3	1 2 2	12/18					ML	SILT, sandy (ML), yellowish red (5YR 4/6), moist, soft, ~10% fine sand, ~10% fine gravel, micaceous nonplastic, FILL		555
15												554
16												553
17												552
18												551
19		SPT 4	WOH 2 2	4/18					ML	SILT, sandy (ML), yellowish red (5YR 4/6), moist, soft 10% fine sand, 5-10% fine gravel, micaceous, nonplastic, FILL		550
20												549
21									▼			548
22												547
23												546
24		SPT 5	WOH 2 3	8/18								545
25												544
26									▽			543
27												542
28												541
29									SM	SAND, silty (SM) with gravel, dark gray (7.5YR 4/1) and dark brown (7.5YR 3/2), wet, very dense fine sandy, ~15% silt, micaceous FILL	Groundwater at 28.5 ft	540
30		SPT 6	WOH 26 50/2	18/18					GP	Gravel (GP), dark gray (N 4) wet, fine gravel, <15% fine sand PARTIALLY WEATHERED ROCK	Rods sunk 0.8 ft to 29.3 ft Weight of hammer (WOH) for 5" - 26/1"	539
31											Gravel layer "shot rock" or the like at 29.9 ft	538
32											Auger refusal at 29.9 ft	537
33											Setup wash drilling equipment 2 7/8" roller cone through hollow augers	536
34												535
35												534
36												533
37												532
38												531
39												530
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1074**	
Type and Diameter of Boring Wash Rotary / NQ core / 4 inch	Boring Location Unit 1 N 1166070 E 1846246		Total Depth 67.5 feet
Drilling Contractor and Rig MACTEC/Warren/211797 / CME 75	Elevation and Datum 569.2 feet MSL	Ground Water Depth 21.1 feet	Depth to Bedrock 31.5 feet
Casing Size and Depth 4 inch / 31 feet	Length of Core Barrel and Bit 8.5 feet / 8.5 feet	No. of Core Boxes 2	Date Started 3/5/07
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/9/07

Reviewed by / Date M. Gray 3/29/07

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
32–33		9	1.7/2.2	25	MW-HW	R3		META-GRANODIORITE; light gray to very dark gray (N 7 to N 3), speckled "salt and pepper" appearance, 20 to 25% mafics, 15 to 20% quartz, 55 to 65% plagioclase, 0.5 inch thick, vuggy quartz vein at 33 ft at 60° , medium grained, moderately to highly weathered, medium strong to strong, healed joint dipping 45° present from 32.55 to 32.75 feet Manganese oxide staining on most natural joints, dry	No record of sample 7 or run 8 When the casing was set, casing was not centered over the cored hole. Continued coring (Run 9) from depth of casing at 31.5 ft. Groundwater measured at 12.5 ft 30 minutes after drilling terminated End drilling for 3/5/07. Groundwater measured at 25.4 ft Changed to higher gear at ~36.7 ft Losing ~70% of water down hole Driller noted a void at 38.0 to 38.1 Ft Run 11 core was stuck in barrel broken while getting it out Pressuremeter Test: 42.7 ft on 3/7/07 Pressuremeter Test: 44.4 ft on 3/7/07 Water level 7:30 a.m. 3/8/07 25.8 ft below ground level Conducted SPT test at 46.0 ft 50/2" (7A) Pressuremeter Test: 48.2 ft on 3/7/07 Pressuremeter Test: 49.2 ft on 3/8/07 Gray water returns for Run 14 SPT conducted from 51.0 ft to 51.15 ft (8A) 50/2" Pressuremeter Test: 53.3 ft on 3/8/07 Pressuremeter Test: 54.8 ft on 3/8/07 Brown to clear water returns for Run 15 Pressuremeter Test: 58.3 ft on 3/8/07 No core recovery from 60.5 ft to 61.0 ft Pressuremeter Test: 62.8 ft on 3/8/07 Pressuremeter Test: 64.3 ft on 3/8/07 Drill string vibrating a lot during Run 17 Stopped after 1.5 ft of drilling PVC casing, broke with mud entering hole Stopped drilling and abandoned hole	537
33–34										536
34–35		10	3.6/5.0	24	MW	R3 to R4				535
35–36										534
36–37										533
37–38										532
38–39		11	2.2/5.0	44	SW	R4				531
39–40										530
40–41										529
41–42										528
42–43							Lee2			527
43–44										526
44–45		12	1.5/2.3	0	MW	R3	Lee1	META-GRANODIORITE to META-QUARTZ DIORITE; brown (7.5YR 4/4) quartz mica schist, fine grained, moderately weathered, medium strong, dry		525
45–46										524
46–47								META-GRANODIORITE; primarily light gray (N 7), with grains that are very dark gray (N 3), ~ 75% plagioclase, 10 to 15% quartz, 10% hornblende, medium grained, slightly weathered, strong, dry. Natural joints coated with oxide minerals from 46.2 to 53.1 ft. Hornblendes weathered along grain margins (7.5YR 4/6). Below 53.1 weathering decreasing. Diabase dike intrudes at an angle of 70° from 51.1 to 51.55 ft. Quartz intrusions that are vuggy at 52.7, 53.3, 53.6, 54.6, and 54.8 ft. Subvertical incipient fractures from 51.6 to 53.0 ft. Secondary mineralization on joint faces includes oxides and epidote Rock becomes slightly weathered from 55.8 to 58.4 ft.		523
47–48		13	1.0/5.0	0	SW	R4	Lee4			522
48–49							Lee3			521
49–50										520
50–51										519
51–52										518
52–53										517
53–54		14	4.3/5.0	52	SW to F	R4	Lee6			516
54–55							Lee5			515
55–56										514
56–57										513
57–58		15	3.2/4.5	9	SW	R4	Lee7			512
58–59										511
59–60										510
60–61								META-QUARTZ DIORITE; light gray matrix (7/N) with medium gray (5/N) and dark brown (7.5YR 3/4) phenocrysts, 75% plagioclase, ~ 10% quartz, ~ 10% hornblende, medium grained, strong, dry, many steeply dipping very thin dikes, 0.5 inch vuggy quartz intrusion near 62.6 ft.		509
61–62			0.5							508
62–63		16	4.5/5.0	66	F	R4	Lee9			507
63–64							Lee8			506
64–65										505
65–66										504
66–67		17	0.5/1.5	33	F	R4				503
67–68										502
68–69										501
69–70										500
70–71								Total Depth 67.5 ft. Groundwater encountered at 21.1 feet		499
										498

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1074

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
72								Borehole Grouted On 4/6/07	Water level on 3/11/07 10:15 a.m. is 21.1 ft below ground surface	497
73										496
74										495
75										494
76										493
77										492
78										491
79										490
80										489
81										488
82										487
83										486
84										485
85										484
86										483
87										482
88										481
89										480
90										479
91										478
92										477
93										476
94										475
95										474
96										473
97										472
98										471
99										470
100										469
101										468
102										467
103										466
104										465
105										464
106										463
107										462
108										461
109										460
110										459
111										458

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1074A**	
Type and Diameter of Boring NQ / HQ Core / 4 inch	Boring Location Unit 1 N 1166067 E 1846253		Total Depth 121.9 feet
Drilling Contractor and Rig MACTEC/Warren/211797 / CME 75	Elevation and Datum 569.2 feet MSL	Ground Water Depth 23.7 feet	Depth to Bedrock 31.9 feet
Casing Size and Depth 4 inch / 39.5 feet	Length of Core Barrel and Bit 8.5 feet / 8.5 feet	No. of Core Boxes 6	Date Started 3/9/07
	Borehole Inclination -90	Logged by R. Turner	Date Completed 3/22/07

Reviewed by / Date M. Gray 3/29/07

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
32–39								Rock fragments from 31.9 to 39.5 ft. fresh, strong, granodiorite	Based on B-1074 soil was not logged, top of rock at 31.9 ft	537–530
40–44		1	4.5/5.0	88	F	R4		META-GRANODIORITE; light gray to gray (7/N to 6/N), medium grained, ~ 15% hornblende/pyroxene, ~ 35% quartz, ~40% plagioclase, ~10% potassium feldspar, fresh, strong, dry, vuggy quartz veins at 41.4, 41.9 and 42.7 ft., walls of the vugs are coated with secondary oxide mineralization By 43 ft. potassium feldspar increases to ~ 15% CONTINUOUS ROCK	Casing set 8.4 ft into rock to 39.5 ft	529–525
45–49		2	4.4/5.0	88	F	R4			Rod vibrating a lot during run 2 especially the last foot	524–520
50–54		3	3.6/4.5	80	F	R4	Lee12 Lee11	META-GRANODIORITE; light to medium gray (7/N to 5/N), medium grained, 10 to 15% hornblende and pyroxene, ~ 10% potassium feldspar, 55 to 65% plagioclase, fresh, strong, dry, few vuggy intrusive veins	Very little water return during Run 3 (Losing ~90%) Pressuremeter Test: 52.2 ft on 3/12/07	519–516
55–56		4	2.5/2.5	100	F	R4	Lee10		Pressuremeter Test: 53.2 ft on 3/12/07 Very little water return during Run 4 (losing 90%+ down hole)	515–513
57–61		5	2.8/5.0	56	F	R3 to R4	Lee14	DIORITE; medium dark gray (3/N), fine grained, fresh, medium strong, dry META-GRANODIORITE; light gray to light bluish gray (7/N to 10B 7/1), medium grained, 50% plagioclase, 20 to 25% quartz, 10 to 15% hornblende and pyroxene, 5% potassium feldspar, fresh, strong, dry Thin (0.1 ft) layer of phyllite/schist at contact	Pressuremeter Test: 54.7 ft on 3/12/07 At 59.5 ft rod advance approximately ~0.6 ft very quickly	512–509
62–63		6	2.0/2.0	100	F	R4	Lee13		Pressuremeter Test: 60.8 ft on 3/12/07 Pressuremeter Test: 62.3 ft on 3/12/07	508–506
64–68		7	4.9/5.0	98	F	R4	Lee17 Lee16 Lee15	0.5 to 0.8 inch quartz vein at 64 ft. META-GRANODIORITE; light gray to blusih gray (7/N to 10B 6/1), medium grained, 15 to 20% hornblende/pyroxene, 30% quartz, 40 to 45% plagioclase, 5% potassium feldspar, fresh, strong, dry 0.3 ft. thick mafic rich zone at 66.6 ft.	Pressuremeter Test: 65.3 ft on 3/12/07 Pressuremeter Test: 66.8 ft on 3/12/07	505–501
69–70		8	2.0/2.0	100	F	R4		At approximately 69 ft. potassium feldspar increases to ~ 15%, plagioclase decreases to 30 to 35% Few vuggy thin veins cut through at high angles.	Drill rod vibrated a lot from 67.5 ft to 68.5 ft Pressuremeter Test: 68.3 ft on 3/13/07 At ~68.8 ft drill rapidly advanced 0.2 ft (soft zone).	500–498
71										

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1074A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
72–74		9	3.8/3.9	90	F	R4	Lee21, Lee20		While reaming HQ, lost all water returns at 70 ft Pressuremeter Test: 72.3 ft on 3/13/07 Drill rod chatter from 72.5 ft to 73.5 ft	497–495
75–77		10	3.3/3.1	100	F	R4	Lee19, Lee18		Pressuremeter Test: 73.8 ft on 3/13/07	494–493
78–80		11	3.4/3.5	90	F	R4			Pressuremeter Test: 75.3 ft on 3/13/07 Pressuremeter Test: 75.8 ft on 3/13/07 Rod chatter from 77.5 ft to 78.5 ft	492–490
81							Lee22	META-GRANODIORITE; light gray to light bluish gray (7/N to 10B 7/1), medium grained, fresh, strong, dry.		489
82–84		12	3.7/3.5	100	F	R4	Lee24, Lee23	META-DIORITE; dark bluish gray (10B 4/1), fine grained, ~55% mafics, ~ 45% plagioclase, fresh, strong, dry, numerous very thin to thin (up to 0.2 inch) quartz veins cut core at high angles. Diorite is very slightly metamorphosed.	Pressuremeter Test: 80.5 ft on 3/14/07 Sharp contact Pressuremeter Test: 81.7 ft on 3/14/07	488–486
85		13	1.6/1.6	97	F	R4			Driller Jason Cain took over rig from Jimmy Warren after Run 12.	485–484
86–88		14	2.9/3.0	97	F	R4		META-GRANODIORITE; light gray to light bluish gray (7/N to 10B 7/1), medium grained, ~ 30% mafics, ~ 25% quartz, ~ 40% plagioclase, ~ 5% potassium feldspar, fresh, strong, dry.	Switched to HQ coring with 5 ft runs. Water level 9:00 a.m. 3/15/07 at 22.8 ft Pressuremeter Test: 83.2 ft on 3/14/07	483–482
89–94		15	4.9/5.0	98	F	R4		Some phenocrysts of mafics up to 0.7 inch present from 89.8 to 91.2 ft. Very thin (<0.1 inch) quartz veins closely to moderately spaced cut through at high angles. Veins at 91.7 and 93.1 ft. are very vuggy, incipient fracture planes.		481–475
95–96		16	4.4/4.4	100	F	R4		META-GRANODIORITE; bluish gray (10B 7/1), ~ 40% potassium feldspar, ~ 30% quartz, ~ 20% mafics, ~ 10% plagioclase, medium grained, fresh, strong, dry, numerous closely spaced thin (<0.1 inch) mafic intrusions.	Gradational contact Water level at 9:50 a.m. 23.7 ft 3/21/07 taped hole to 96.0 ft	474–473
97–99		17	0.4/0.4	87.5	F	R4				472–470
100–104		18	4.7/5.0	88	F	R4		Thin (<0.1 inch) mafic intrusions not visible at 101.9 ft. At 103.5 ft. potassium feldspar percentage decreases to 10 to 15%, ~ 30 to 35% mafics, ~ 25% quartz, ~ 35% plagioclase.	Poor water returns during Runs 18,19, and 20	469–465
105–108		19	5.0/5.0	100	F	R4		Thin foliated bands of from 108 to 108.1 ft. and 108.5 to 108.7 ft.		464–461
109–111		20	4.9	98	F	R4		META-GRANODIORITE; bluish gray (10B 7/1), medium grained, ~ 30 to 35% mafics, ~ 30% plagioclase, ~ 20% quartz, ~ 15 to 20 % potassiuim feldspar, fresh, strong,		460–458

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1074A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
112			5.0					dry, fine grained zone from 110 to 110.1 ft. , below 110.1 ft are few subvertical healed joints.		457
113										456
114								Steeply dipping healed joints from 114.3 to 115.1 ft.		455
115		21	2.6/3.0	87	F	R4			Poor water returns during Run 21	454
116									Slight rod chatter from 115.9 to 116.7 ft	453
117										452
118										451
119		22	4.3/5.0	85	F	R4			It is possible that some core from Run 22 was left in hole. RQD for the 4.25 ft retrieved would be 100%	450
120										449
121										448
122									Attempted to measure depth to bottom but weight on measuring tape would not sink through mud in hole.	447
123										446
124										445
125								Total Depth 121.9 ft.		444
126								Groundwater encountered at 23.7 feet		443
127								Borehole Grouted On 4/6/07		442
128										441
129										440
130										439
131										438
132										437
133										436
134										435
135										434
136										433
137										432
138										431
139										430
140										429
141										428
142										427
143										426
144										425
145										424
146										423
147										422
148										421
149										420
150										419
151										418

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. B-1075**	
Type and Diameter of Boring Hollow stem / 6.5 inch	Boring Location Unit 1 N 1166030 E 1846256		Total Depth 23.7 feet
Drilling Contractor and Rig MACTEC/Warren/211797 / CME 75	Elevation and Datum 569.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Hollow-stem augers with split sampler	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 4	Date Started 3/22/07
	Borehole Inclination -90	Logged by R. Turner	Date Completed 3/22/07

Reviewed by / Date M. Gray 3/29/07

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3												569–567
4–5		SPT 1	4 3 2	12/18					SM	SAND silty (SM), strong brown (7.5YR 4/6), loose to very loose density, subangular, minimum size is silt, maximum size is fine sand damp FILL		566–565
6–8											Gravel layer from 7.0 ft to 7.5 ft	564–562
9–10		SPT 2	1 3 3	6/18						SAND silty (SM), yellowish brown (10YR 5/4), very loose density, subangular, minimum size is silt, maximum size is fine sand, damp, FILL		561–560
11–13												559–557
14–15		SPT 3	2 3 2	6/18					SM	SAND silty with gravel (SM), strong brown (7.5YR 4/6), very loose density, subangular, minimum size is silt, maximum size is a 1 inch piece of gravel FILL, damp		556–555
16–18												554–552
19–20		SPT 4	WOH 1 2	9/18					SW-SM	SAND silty (SW-SM), medium toughness, yellowish brown (10YR 5/4) medium stiff, slow dilatency, nonplastic, well graded, damp to moist, maximum size coarse sand FILL	WOH = weight of hammer Hole abandoned as the augers hit rock or gravel layer and deviated from vertical	551–550
21–23												549–547
24		SPT 5	50/2	3/2					GW	GRAVEL, light gray (7/N), angular, 1.5 inch, single piece SPT refusal	SPT refusal at 23.5 ft. See B-1075A	546
25–40												545–530

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. B-1075A**	
Type and Diameter of Boring Hollow stem / HQ Core / 6.5 inch	Boring Location Unit 1 N 1166036 E 1846257		Total Depth 150.4 feet
Drilling Contractor and Rig MACTEC/Warren/211797 / CME 75	Elevation and Datum 569.5 feet MSL	Ground Water Depth 23.4 feet	Depth to Bedrock 24.3 feet
Casing Size and Depth 4.5 inch / 23.7 feet	Length of Core Barrel and Bit 8.6 feet / 8.6 feet	No. of Core Boxes 11	Date Started 3/23/07
	Borehole Inclination -90	Logged by R. Turner	Date Completed 3/27/07

Reviewed by / Date M. Gray 3/29/07

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	Lithology	Remarks
1	0.3 / 0.3	0	SW	R4		
2	4.5 / 5.0	86	SW	R4	META-GRANODIORITE; light gray (N 7) to light bluish gray (10B 7/1), 35 to 40% quartz, 25 to 30% plagioclase, ~ 20% biotite/hornblende, ~ 10% potassium feldspar, slightly weathered, strong, dry. Vuggy incipient fractures from 25.5 to 26.4 ft.	
3	5.4 / 5.0	28	SW	R4	Natural joints from 32.5 to 33.7 ft. have iron oxide secondary mineralization	No water returns during last 0.5 inches of Run 3
4	5.0 / 5.0	94	F	R4	META-GRANODIORITE; light bluish gray (10B 7/1), ~ 30% quartz, ~ 30% potassium feldspar, ~ 25% plagioclase, ~ 15% biotite, medium grained, fresh, strong, dry. Fine grained zone from 36.4 to 36.6 ft. (primarily composed of potassium feldspar) CONTINUOUS ROCK	
5	4.7 / 5.0	86	F	R4	SAA; between 40 and 42.5 ft. potassium feldspar decreases to 5 to 10%, quartz increase to ~ 40%.	
6	4.7 / 5.0	68	F	R4	SAA; from 45.9 to 49.3 ft. core intersects a subvertical quartz vein which spalls off	
7	4.8 / 5.0	76	SW to F	R4	META-GRANODIORITE; light bluish gray (10B 7/1), medium grained, ~ 30 to 35% biotite/hornblende, ~ 25% quartz, ~ 20% potassium feldspar, ~ 20% plagioclase, fresh, strong dry. Slightly weathered from 52.6 to 54.6 ft. Vuggy incipient fracture from 53 to 53.55 ft.	
8	5.3 / 5.0	93	F	R4	SAA; from 55.8 to 57.0 ft few subvertical mafic veins Subvertical quartz vein intrusion from 57.7 to 58.4 ft.	Mechanical breaks from 58.3 ft to 59.3 ft caused while removing core from sample barrel
9	5.1 / 5.0	100	F	R4	0.8 inch thick quartz vein at 63.6 ft.	

Depth (feet): 25–64. Elevation (feet): 545–506.

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1075A

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
65–67	10	3.0/3.0	100	F	R4		META-GRANODIORITE;; light bluish gray (10B 7/1), medium grained, ~ 35% biotite/hornblende, ~ 25% quartz, ~ 25% plagioclase, ~ 15% potassium feldspar, fresh, strong, dry.		505–504
68–69	11	2.1/2.0	100	F	R4		Very thin quartz vein (0.1 inch) cuts core from 65.7 to 66.3 ft. Very thin quartz vein (<0.1 inch) at 68.5 ft.		503–501
70–74	12	4.4/5.0	88	F	R4		Quartz veins at 69.2 and 69.4 ft. (~0.1 to 0.2 inch thick)	At 70, 0.3 ft, drill advanced rapidly	500–496
75–79	13	5.0/5.0	100	F	R4		0.1 inch quartz vein at 75.8 ft.		495–491
80–82	14	1.7/3.0	57	F	R4		META-QUARTZ DIORITE; light bluish gray to bluish gray (10B 7/1 to 10B 6/1), medium grained, ~ 35% biotite/hornblende, ~35% quartz, ~ 25% plagioclase, ~ 5% potassium feldspar, strong, fresh, dry.	Gradational contact at 80 ft After Run 14 was cored, the core wouldn't break at the bottom	490–487
83–84	15	1.7/2.0	85	F	R4		META-GRANODIORITE;; light bluish gray (10B 7/1), medium grained, fresh, strong, dry, 0.1 to 0.7 inch quartz veins.	Pulled rod to get core out 82.8 ft gradational contact	486–485
85–89	16	5.0/5.0	100	F	R5		META-DIORITE; dark bluish gray (10B 4/1), fine grained, fresh, strong, 0.1 to 0.2 inch quartz veins from 86 to 88.1 ft.	At ~85 ft, water returns changed from light to dark gray	484–480
90–94	17	4.9/5.0	97	F	R5		META-GRANODIORITE;; light bluish gray (10B 7/1), ~ 35% quartz, ~ 30% plagioclase, ~ 25% biotite/hornblende, ~ 10% potassium feldspar, medium grained, fresh, very strong, phenocrysts of mafics 0.5 to 2.4 inch from 90.5 to 92.8 ft.	Sharp contact that occurs between 89.6 ft and 89.8 ft	479–476
95–99	18	4.9/5.0	97	F	R5		META-GRANODIORITE;; light bluish gray (10B 7/1), medium grained, fresh, very strong, dry. Zone from 94.9 to 95.6 ft. is ~ 40% quartz, ~ 40% plagioclase, ~ 15% potassium feldspar, ~ 5% biotite/hornblende. Below 95.6 ft. rock is ~ 40% biotite/hornblende, ~ 30% quartz, ~ 20% plagioclase, ~ 10% potassium feldspar. From 96.2 to 97.4 ft. are 6 healed joints dipping 60 to 70 degrees spaced 1.5 to 4.0 inches apart.		475–470
100–104	19	5.0/5.0	100	F	R5		Two generations of quartz vein intrusions between 102.9 and 103.3 ft., a feldspathic quartz vein cuts and offsets a		469–466

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1075A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
						pure quartz vein.	
20	5.3/5.0	100	F	R5		META-QUARTZ DIORITE; bluish gray (10B 6/1), medium grained, fresh, very strong, dry. 0.8 inch thick feldspathic quartz vein cuts core at 65 degrees from 105.85 to 106.55 ft. From 107.3 to 107.7 ft. and 108.2 to 108.45 ft. rock is fine grained and gneissic.	Gradational contact
21	4.7/5.0	93	F	R5		META-QUARTZ DIORITE; light bluish gray (10B 7/1), medium grained, ~ 45% biotite/hornblende, ~ 35% quartz, ~15% plagioclase, ~ 5% potassium feldspar, fresh, very strong, dry.	Gradational contact
22	5.0/5.0	100	F	R5		META-GRANODIORITE; light bluish gray (10B 7/1), medium to coarse grained, ~ 35% quartz, ~ 30% biotite/hornblende, ~ 20% plagioclase, ~ 15% potassium feldspar, fresh, very strong, dry. 1.2 inch quartz vein from 112.25 to 113.1 ft. healed microfaulted quartz veins from 113.8 to 114.1 ft. 0.2 inch thick quartz vein at 116.6 ft. Granite from 116.8 to 117.3 ft. From 118.8 to 119.6 ft. a single 3 inch thick quartz vein comprises 40 to 60% of the core	
23	3.2/3.2	100	F	R5		META-QUARTZ DIORITE; bluish gray (10B 6/1), fine to medium grained, 50 to 55% quartz, 35 to 40% plagioclase, ~ 10% biotite, <5% potassium feldspar, fresh, very strong, dry. Subvertical mafic intrusion from 119.8 to 120.45 ft.	Measured water level at 23.4 ft at 7:30 a.m., 3/26/07
24	1.9/2.0	95	F	R5			
25	5.0/5.0	100	F	R5		META-QUARTZ DIORITE; light bluish gray (10B 7/1), ~ 40% biotite/hornblende, ~ 30% quartz, ~ 30 % plagioclase, ~ 5% potassium feldspar, medium grained, fresh, very strong, dry. Granitic zone with 0.5 inch thick quartz vein from 125.5 to 125.8 ft.	
26	5.1/5.0	100	F	R5			
27	2.0/2.0	100	F	R5		0.3 inch thick quartz vein cuts core at 70 degrees from 135.1 to 135.5 ft.	
28	2.7/3.0	90	F	R5			Mechanical breaks from 138.5 to 139.5 ft caused while removing core from sample barrel
29	4.7/5.0	94	F	R5		META-QUARTZ DIORITE; light bluish gray (10B 7/1), medium grained, ~ 40% biotite, ~ 35% quartz, ~ 20% plagioclase, ~ 5% potassium feldspar, fresh, very strong, dry. 0.1 inch quartz vein from 140.2 to 140.6 ft. 0.5 to 0.7 inch thick quartz vein from 142.5 to 142.75 ft.	

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. B-1075A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
145										425
146										424
147		30	5.0/5.0	100	F	R5		Mafic xenoliths present from 147 to 147.9 ft.		423
148										422
149										421
150		31	0.6	100	F	R5				420
151			0.6							419
152										418
153								Total Depth 150.4 ft.		417
154								Groundwater encountered at 23.4 feet		416
155								Borehole Grouted On 4/6/07		415
156										414
157										413
158										412
159										411
160										410
161										409
162										408
163										407
164										406
165										405
166										404
167										403
168										402
169										401
170										400
171										399
172										398
173										397
174										396
175										395
176										394
177										393
178										392
179										391
180										390
181										389
182										388
183										387
184										386

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1200**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1166347 E 1845577		Total Depth 8.5 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 591.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 1	Date Started 3/18/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/18/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									SM	Topsoil, sandy (SM).	Begin drilling 3/18/06	591
1									SM	SAND, silty (SM); light yellowish brown to white (10YR 6/4 to 10YR 8/1); dry; fine to medium grained; contains 2 to 3 inch fragments of weathered rock. FILL		590
2												589
3												588
4		CME 1		30/30							Hard drilling 3.5 to 6 ft	587
5												586
6										PARTIALLY WEATHERED ROCK Refusal to hollow stem auger, moved 4 ft east from MW-1200 to core rock, see soil and rock log MW-1200A Refer to MW-1200A for rock description		585
7												584
8											CME sampler refusal	583
9												582
10												581
11												580
12												579
13												578
14												577
15												576
16												575
17												574
18												573
19												572
20												571
21												570
22												569
23												568
24												567
25												566
26												565
27												564
28												563
29												562
30												561
31												560
32												559
33												558
34												557
35												556
36												555
37												554
38												553
39												552
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1200A**	
Type and Diameter of Boring Wash Rotary / NQ core / Tricone 3 7/8 inch	Boring Location General site N 1166348 E 1845580		Total Depth 63.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 591.8 feet MSL	Ground Water Depth 23 feet	Depth to Bedrock 31 feet
Casing Size and Depth 3.5 inch / 8.5 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 3	Date Started 3/27/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/28/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
9–13		1	1.0/5.0	0	CW to HW	R0 to R1			Begin NQ core Began rock coring, see rock log	583–579
14–18		2	2.0/5.0	0	CW to HW	R0 to R1		META-GRANODIORITE; bluish grya (10B 6/1); highly weathered; no recovery. PARTIALLY WEATHERED ROCK.		578–574
19–23		3	1.0/5.0	0	CW to HW	R0 to R1		SAA.	~10% loss of coring water	573–569
24–28		4	2.0/5.0	0	CW to HW	R0 to R1		SAA.		568–564
29–31		5	4.5/5.0	58	CW to HW	R0 to R1			End day 3/27/06 Begin day 3/28/06; water at 23 ft	563–561
32–33					MW	R3		META-GRANODIORITE; bluish gray (10B 6/1); weakly foliated ~ 30 to 45°, 1 to 3 mm grain size; pitting and vugs on surface of core from dissolution of secondary minerals (calcite); quartz veins along foliation.		560–559
34–36		6	5.0/5.0	23	HW to MW	R2		SAA; highly weathered 33.5 to 36 ft.		558–556
37–38					MW	R3				555–554
39–41		7	5.0/5.0	18	HW	R1 to R2		SAA; highly weathered 38.5 to 40.7 ft, more pronounced foliation.		553–551
42–43					MW	R3				550–549
44–46		8	5.0/5.0	0	HW	R1 to R2		SAA; fracture parallel to foliation 43.2 to 43.5 ft. Quartz dike 45.7 to 47 ft.		548–546
47–48										545–544

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1200A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
49		9	5.0/5.0	81	SW to F	R3 to R4		META-DIORITE; dark bluish gray (10B 4/1); medium to coarse grained; slight foliation inclined at 30 to 45° ; quartz, plagioclase, biotite, hornblende; CONTINUOUS ROCK		543
50										542
51										541
52										540
53								Quartz rich zone Shear zone 60°, highly weathered, brecciated along boundaries		539
54		10	5.0/5.0	97	F	R4				538
55										537
56										536
57										535
58										534
59		11	5.0/5.0	100	F	R4		SAA.		533
60										532
61										531
62										530
63									End drilling 3/28/06	529
64								Total Depth 63.5 ft. Groundwater encountered at 23 feet Borehole Grouted On 3/29/06		528
65										527
66										526
67										525
68										524
69										523
70										522
71										521
72										520
73										519
74										518
75										517
76										516
77										515
78										514
79										513
80										512
81										511
82										510
83										509
84										508
85										507
86										506
87										505
88										504

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1201**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1166696 E 1846574		Total Depth 150 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 589.5 feet MSL	Ground Water Depth 36.2 feet	Depth to Bedrock 99 feet
Sampling Method Continuous Sampler/Standard	Sample Driving Hammer/Drop NA / NA	No. of Samples 13	Date Started 3/18/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/21/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	4 topsoil inch with decomposed organics SILT sandy (ML); yellowish brown (10YR 5/6); damp to dry; fine to medium sand; trace mica, trace gravel. FILL	Begin drilling 3/18/06	589
1												588
2												587
3											Begin CME continuous sampling	586
4		CME 1		60/60								585
5												584
6												583
7												582
8												581
9		CME 2		60/60						SAA; red (10R 4/8).		580
10												579
11												578
12										At 12 ft, gravel zone, contains 2 inch diameter angular quartz gravel size rock fragments.		577
13												576
14		CME 3		60/60								575
15												574
16												573
17												572
18												571
19		CME 4		60/60								570
20												569
21												568
22												567
23												566
24		CME 5		12/60						SAA.		565
25												564
26											Low recovery, sampler likely blocked by gravel	563
27												562
28												561
29		CME 6		60/60					SM	SAND, silty (SM); yellowish brown (10YR 5/6); damp; fine grained. FILL		560
30									ML	SILT, sandy (ML); weak red (10R 4/4); damp; fine sand. FILL		559
31												558
32												557
33												556
34		CME 7		60/60					▽			555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1201

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												549
41		CME 8		60/60								548
42												547
43												546
44												545
45		CME 9		45/60								544
46												543
47												542
48												541
49										48.5 to 52.5 ft becomes wet.	End drililng 3/18/06 Begin drilling 3/19/06; water at 42 ft	540
50		CME 10		48/60								539
51												538
52												537
53									SM	SAND silty (SM); brownish yellow to yellow (10YR 6/8 to 10YR 7/6); dry; fine to medium grained; quartz, mica, ~1/8 inch rock fragments; relict metamorphic texture; 3 inch weathered quatz dike; SAPROLITE	Hard drilling 52.5 to 58.5 ft	536
54												535
55		CME 11		42/60								534
56												533
57												532
58												531
59											Very hard drilling	530
60												529
61		CME 12		60/60								528
62										Quartz dike.		527
63										Quartz dike.		526
64												525
65												524
66		CME 13		30/60								523
67												522
68										Refusal to CME sampler and hollow stem augers. Refer to rock log for continuation of borehole log		521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1201**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1166696 E 1846574		Total Depth 150 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 589.5 feet MSL	Ground Water Depth 36.2 feet	Depth to Bedrock 99 feet
Casing Size and Depth 3.5 inch / 68.5 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 7	Date Started 3/18/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/21/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
69–71		1	0.0/5.5	0	RS to CW	R0		SAND silty (SM); dark yellowish brown (10YR 3/6); with rock fragments; SAPROLITE.	End of day 3/19/06; water at 36.75 ft Begin coring 3/20/06; water at 37 ft	521–519
71–74		2	0.8/5.0	0	CW	R0		SAND silty (SM) dark yellowish brown (10YR 3/6); medium to coarse grained with rock fragments; SAPROLITE		519–515
74–79		3	1.0/5.0	0	CW	R0				515–510
79–84		4	1.0/5.0	0	HW to CW	R0				510–505
84–89		5	1.5/5.0	0	HW to CW	R0				505–500
89–94		6	1.0/5.0	0	HW to CW	R0				500–495
94–99		7	5.0/5.0	0	HW	R1 to R2		META-GRANODIORITE; white (10YR 8/1); weathered yellow oxidation; texture and foliation obscured by highly weathering conditions; numerous open veinlets and vugs due to weathering of secondary minerals along interlocking series of fracture; quartz, plagioclase, calcite. PARTIALLY WEATHERED ROCK.	End drilling 3/20/06 Begin drilling 3/21/06; water at 36.2 ft	495–490
99–108		8	1.5/5.0	0	CW	R0		PARTIALLY WEATHERED ROCK SAA.		490–481

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1201

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	4.3/5.0	0	HW	R1 to R2		META-GRANODIORITE; weathered yellow (10YR 7/8); branching/interlocking vertical fractures, abundant calcite along fractures and vugs. PARTIALLY WEATHERED ROCK	
			CW	R0		SAA.	
10	5.0/5.0	83	MW	R2 to R3		META-DIORITE; greenish gray (10GY 4/1); very fine grained, calcite in stringers and parallel to foliation; CONTINUOUS ROCK	
			F	R4			
11	5.0/5.0	100	F	R4			
12	5.0/5.0	80	F	R4			
13	5.0/5.0	94	F	R4			
14	5.0/5.0	100	F	R4			
15	5.0/5.0	94	F	R4			
16	6.0/6.0	91	F	R4			

Depth (feet): 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148

Elevation (feet): 481, 480, 479, 478, 477, 476, 475, 474, 473, 472, 471, 470, 469, 468, 467, 466, 465, 464, 463, 462, 461, 460, 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448, 447, 446, 445, 444, 443, 442, 441

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1201

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
149								SAA.		441
150					MW	R3			End drilling 3/21/06	440
151										439
152										438
153								Total Depth 150 ft.		437
154								Groundwater encountered at 36.2 feet Borehole Grouted On 6/8/06		436
155										435
156										434
157										433
158										432
159										431
160										430
161										429
162										428
163										427
164										426
165										425
166										424
167										423
168										422
169										421
170										420
171										419
172										418
173										417
174										416
175										415
176										414
177										413
178										412
179										411
180										410
181										409
182										408
183										407
184										406
185										405
186										404
187										403
188										402
										401

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1202**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1167007 E 1847460		Total Depth 48.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.3 feet MSL	Ground Water Depth 24 feet	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 9	Date Started 3/14/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/15/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									SM	SAND, silty (SM); weak red (10R 4/4); dry; fine to medium grained; some quartz rock fragments; zones of light brown fine sand. FILL	Begin drilling on 3/14/06	587–584
4–8		CME 1		34.8/60								583–579
9–13		CME 2		7.2/60						SAA; damp to moist; micaceous.		578–574
14–16		CME 3		43.2/60								573–571
17–18									ML	SILT, clayey, sandy (ML); dark brown (7.5YR 3/3); moist; micaceous; trace quartz fragments; trace wood fragments. FILL		570–569
19–20		CME 4		60/60								568–567
21–23									ML	SILT, (ML); strong brown (7.5YR 4/6); moist; low plasticity; micaceous; trace fine sand. RESIDUUM	Water on rods at ~22 ft	566–564
24–27		CME 5		58.8/60					∇	SAA; red (2.5YR 4/6); and reddish yellow (7.5YR 6/6) with black (7.5YR 2.5/1); seams; wet; low plasticity; little mica. RESIDUUM	Saturated soil cuttings	563–560
28–31		CME 6		25.2/60					ML	SILT, (ML); red (2.5YR 4/6); and reddish yellow (7.5YR 6/6) with black (7.5YR 2.5/1); seams; wet; low plasticity; little mica. SAPROLITE		559–556
32–36		CME 7		31.2/60						SAA; mottledvery dark brown (10YR 2/2) to yellowish brown (10YR 5/4) to grayish brown (10YR 5/2); wet; trace fine sand; very micaceous; low to no plasticity. SAPROLITE	Harder drilling	555–551
37–39										SAA; yellowish brown (10YR 5/4) to grayish brown (10YR 5/2); wet; 10% sand; nonplastic; micaceous.		550–548
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1202

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												547
41		CME 8		32.4/60					ML	SAPROLITE		546
42												545
43												544
44										SAA. SAPROLITE		543
45												542
46		CME 9		40.8/60								541
47												540
48											End of day 3/14/06 Begin day 3/15/06; water at 24 ft Very hard drilling, lost drilling tools in the hole See MW-1202A	539
49												538
50												537
51										Total Depth 48.5 ft. Groundwater encountered at 24 feet Borehole Grouted On 4/10/06		536
52												535
53												534
54												533
55												532
56												531
57												530
58												529
59												528
60												527
61												526
62												525
63												524
64												523
65												522
66												521
67												520
68												519
69												518
70												517
71												516
72												515
73												514
74												513
75												512
76												511
77												510
78												509
79												508
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	**SOIL LOG - Boring No. MW-1202A**		
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location General site N 1167013 E 1847466		Total Depth 115.6 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.5 feet MSL	Ground Water Depth 16.8 feet	Depth to Bedrock 60.6 feet
Sampling Method SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 7	Date Started 3/15/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/18/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										No samples attempted, refer to MW-1202.	Offset boring from MW-1202. Drilled without sampling to 48.5 ft	587
1												586
2												585
3												584
4												583
5												582
6												581
7												580
8												579
9												578
10												577
11												576
12												575
13												574
14												573
15												572
16												571
17									▽			570
18												569
19												568
20												567
21												566
22												565
23												564
24												563
25												562
26												561
27												560
28												559
29												558
30												557
31												556
32												555
33												554
34												553
35												552
36												551
37												550
38												549
39												548
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1202A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40–48										No samples attempted, refer to MW-1202. *(Continued from previous page)*	Offset boring from MW-1202. Drilled without sampling to 48.5 ft. Begin SPT sampling at 48.5 ft	547–540
49–50		SPT 1	6 8 10	13.2/24					SM	SAND, silty (SM); light gray (5YR 7/1) and yellowish brown (10YR 5/4); damp; fine to medium grained; 15% silt; trace mica. SAPROLITE	Start MW-1202A at 48.5 ft with SPT sampling	539–538
51–52		SPT 2	4 7 8	18/24							Drove spoon with hammer 24 inches to obtain continuous soil sample	537–536
53–54		SPT 3	4 5 10	12/24							SPT HAMMER WEIGHT NOT CERTIFIED-SPT BLOWS FOR INFORMATION ONLY AND NOT DESIGN INPUT	535–534
55–56		SPT 4	8 10 15	19.2/24						SAA; light gray (5YR 7/1); and very dark greenish gray (5BG 3/1); fine to medium grained; 20% silt, micaceous. SAPROLITE		533–532
57–58		SPT 5	5 8 39	20.4/20.4								531–530
59–60		SPT 6	50/1.2	0/1.2					SP	SAND (SP); black (5YR 2.5/1); and light gray (5YR 7/1); micaceous. PARTIALLY WEATHERED ROCK	See rock log MW-1202A	529–528
61		SPT 7	50/1.2	0/1.2								527
62–80												526–508

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1202A**	
Type and Diameter of Boring Wash Rotary / Tricone 3 7/8 inch	Boring Location General site N 1167013 E 1847466		Total Depth 115.6 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 587.5 feet MSL	Ground Water Depth 16.8 feet	Depth to Bedrock 60.6 feet
Casing Size and Depth 3.5 inch / 60.6 feet	Length of Core Barrel and Bit 8.1 feet	No. of Core Boxes 8	Date Started 3/15/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/18/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
61–65		1	4.8/5.0	28	HW	R2 to R3		META-GRANODIORITE; very pale brown (10YR 7/2); fine to medium grained. Highly jointed rock dipping 0 to 90° partly healed with manganese iron oxide and calcite	Start drilling 3/17/06; water at 16.8 ft; partial loss of water return See rock log MW-1202A	526–522
66–70		2	5.0/5.0	42	HW	R2 to R3		SAA. Foliations dipping 35 to 55°		521–518
71–75		3	5.0/5.0	56	HW	R2 to R3				517–512
76–80		4	3.2/5.0	42	HW	R2 to R3		SAA; bluish gray (10B 5/1)		511–507
81		5	4.8/4.8	74	HW	R2 to R3		SAA. CONTINUOUS ROCK.		506
82–84						R1 to R2		Joints not filled or healed Badly broken zone		505–504
85–90		6	5.0/5.0	98	SW	R3 to R4		SAA; medium to coarse grained; weakly foliated; biotite, calcite		503–498
91–95		7	5.0/5.0	86	SW	R3 to R4				497–493
96–100		8	4.9/5.0	92	SW	R3 to R4				492–487

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1202A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
101–105		9	5.2/5.2	98	SW	R3 to R4		META-GRANODIORITE, as described above.		486–482
106–110		10	5.0/5.0	100	SW	R3 to R4		SAA.		481–477
111–115		11	4.7/5.0	86	SW	R3 to R4		SAA.		476–472
116–140								Total Depth 115.6 ft. Groundwater encountered at 16.8 feet Borehole Grouted On 4/10/06	Coring terminated at 115.6 ft on 3/18/06	471–447

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1203**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location Cooling Tower Unit 2 N 1166694 E 1847841		Total Depth 112.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.5 feet MSL	Ground Water Depth 18 feet	Depth to Bedrock 42.5 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 8	Date Started 3/29/06
	Borehole Inclination -90	Logged by M. DePalma	Date Completed 3/31/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	1 ft of topsoil SILT, sandy (ML); orange red (5YR 5/8); dry; micaceous. FILL	Auger cuttings examined 0 to 3.5 ft	589–586
4–8		CME 1		21.5/60						SILT, sandy (ML); yellowish red (5YR 5/8); dry; micaceous; black lenses observed. FILL		585–581
9–13		CME 2		60/60					ML	SILT, sandy (ML); yellowish red (5YR 5/6); stratified red, gray bands near end of run; SAPROLITE		580–576
14–18		CME 3		60/60					▽	Strong brown (7.5YR 5/6); damp; micaceous.		575–571
19–23		CME 4		60/60						Brown (7.5YR 5/2); moist.		570–566
24–28		CME 5		38/60							Wet 26 to 27 ft	565–562
29–33		CME 6		30/60						Damp to moist.		561–556
34–38		CME 7		25/60								555–552
39–40									SM	SAND, silty (SM); pinkish gray (7.5YR 6/2) medium to coarse grained; moist; micaceous. SAPROLITE		551–550

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1203

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40		CME 8		13.5/48						Description on previous page.		549
41												548
42											Auger refusal at 42.75 ft on 3/27/06, see rock log begins 42.5 ft	547
43												546
44												545
45												544
46												543
47												542
48												541
49												540
50												539
51												538
52												537
53												536
54												535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1203**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location Cooling Tower Unit 2 N 1166694 E 1847841		Total Depth 112.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 589.5 feet MSL	Ground Water Depth 18 feet	Depth to Bedrock 42.5 feet
Casing Size and Depth 3.5 inch / 42.5 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 5	Date Started 3/29/06
	Borehole Inclination -90	Logged by M. DePalma	Date Completed 3/31/06

Reviewed by / Date F. Syms 5/26/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
43–47		1	0.3/5.0	0	CW to HW	R0 to R1		META-GRANODIORITE; gray (N 7); fine to medium grained, other dark minerals, green, gray clay (CL) at the top of core run		547–543
48–52		2	1.0/5.0	0	CW to HW	R0 to R1		SAA; no recovered clay		542–538
53–57		3	1.7/5.0	0	CW to HW	R0 to R1				537–533
58–62		4	3.6/5.0	0	HW to MW	R1		META-GRANODIORITE; gray (10Y 7/1); fine grained; biotite, epidote, iron staining; foliation 40°		532–528
63–67		5	2.7/5.0	10	MW	R2		Foliation 30° less secondary minerals		527–523
68–72		6	2.7/5.0	0	MW	R1 to R2		META-GRANODIORITE; dark green gray (10Y 4/1); foliated 30 to 45°		522–518
73–77		7	4.4/5.0	0	HW to MW	R1 to R2		META-GRANODIORITE; (10Y 6/1); medium to fine grained; foliated 30 to 45°		517–513
78–82		8	5.0/5.0	47	MW to SW	R2 to R3		SAA; (N 8); foliated 30°. Schist layer from 78.5 to 79.5 ft.		512–507

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1203

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
83–87		9	5.0/5.0	47	SW	R3		SAA Quartz vein from 86.5 to 87.5 ft.		507–503
87–92		10	4.8/5.0	68	SW	R4		SAA; (N 5); quartz dike through first 1.5 ft; epidote veins; pyrite. CONTINUOUS ROCK. Quartz dike predominant 88 to 92.5 ft; light bluish gray mineral inclusions.	End drilling on 3/30/06 Begin drilling 3/31/06	502–497
93–97		11	4.8/5.0	85	SW to F	R4 to R5		META-DIORITE; very dark gray (N 3); quartz dike upper 3 inches, foliation widely spaced at top 1.5 ft.		496–492
98–102		12	5.0/5.0	97.5	F	R4		Calcite veins from 99.5 to 100.5 ft.		491–487
103–107		13	5.0/5.0	100	F	R4 to R5		Epidote veins at 102.5 ft. Pyrite phenocrysts at 104.5 ft.		486–482
108–112		14	5.0/5.0	100	F	R4 to R5		SAA		481–477
113–122								Total Depth 112.5 ft. Groundwater encountered at 18 feet Borehole Grouted On 3/31/06	Coring terminated 3/31/06	476–467

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1204**	
Type and Diameter of Boring CME Sampler / 7.5 inch/NQ	Boring Location Cooling Tower Unit 2 N 1166135 E 1848031		Total Depth 98.4 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.8 feet MSL	Ground Water Depth 39 feet	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 19	Date Started 3/30/06
	Borehole Inclination -90	Logged by C. Gaskins/ E. Weldon	Date Completed 4/2/06

Reviewed by / Date B. Reinicker 5/4/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3										Drilled without sampling to 3.5 ft		609–607
4–8		CME 1		60/60					ML	SILT sandy (ML); (5YR 7/6 to 10YR 7/4); moist; 80% silt, 20% sand; <5% coarse sand to fine gravel; FILL		606–602
9–13		CME 2		60/60						SAA.		601–597
14–18		CME 3		4/60						No recovery, sampler blocked by rock fragment.		596–592
19–23		CME 4		0/60						No recovery.		591–587
24–28		CME 5		12/60					ML	SILT, sandy (ML); (5YR 5/6); moist; medium stiff; 65% silt; 35% sand; less than 5% coarse sand and fine gravel; FILL		586–582
29–33		CME 6		60/60						SAA; (10YR 5/4 to 5YR 5/6 to 10R 4/6); stiff to very stiff.		581–577
34–38		CME 7		60/60						SAA; (5YR 4/4, 5YR 5/6, 10R 6/6, 10YR 5/4, 10R 4/6) Large round rock fragment		576–572
39–40									▽	SAA; (5YR 5/6, 5YR 6/4, 5YR 4/4, 10R 6/6, 10YR 5/4, 10R 4/6)		571–570

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1204

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												
41		CME 8		60/60						SILT, sandy (ML); (5YR 5/6); moist; medium stiff; 65% silt; 35% sand; less than 5% coarse sand and fine gravel; FILL *(Continued from previous page)*		569
42												568
43												567
44										SAA; (5YR 5/6, 5YR 6/4, 5YR 4/4, 10R 6/6, 10YR 5/4, 10R 4/6)		566
45												565
46		CME 9		60/60								564
47												563
48												562
49										SAA; (5YR 5/6, 5YR 6/4, 5YR 4/4, 10R 6/6, 10YR 5/4, 10R 4/6) Angular rock fragment		561
50												560
51		CME 10		60/60								559
52												558
53												557
54										SAA; (5YR 5/6, 5YR 6/4, 5YR 4/4, 10R 6/6, 10YR 5/4, 10R 4/6)		556
55												555
56		CME 11		28/60								554
57												553
58												552
59										SAA; (5YR 5/6, 5YR 6/4, 5YR 4/4, 10R 6/6, 10YR 5/4, 10R 4/6)		551
60												550
61		CME 12		7/60								549
62												548
63												547
64										SILT sandy (ML); (5R 4/6); wet; 80% silt, 20% sand. FILL	End of day 3/30/06 Begin day 3/31/06; water level at 39 ft	546
65												545
66		CME 13		36/60								544
67												543
68												542
69										SAA; (10YR 6/6). FILL		541
70												540
71		CME 14		6/60								539
72												538
73												537
74									SM	SAND silty (SM); (5YR 7/2); wet; 55% sand; 45% silt. FILL		536
75												535
76		CME 15		9/60								534
77												533
78												532
79									ML	SILT sandy (ML); (10YR 6/6); moist to wet; 55% silt, 45% sand. SAPROLITE		531
80												530

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1204

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80												
81		CME 16		36/60						SILT sandy (ML); (10YR 6/6); moist to wet; 55% silt, 45% sand. SAPROLITE *(Continued from previous page)*		529
82												528
83												527
84										SAA; (10YR 6/2 to 10YR 6/6 to 10YR 4/2). SAPROLITE		526
85												525
86		CME 17		48/60								524
87												523
88												522
89										SAA; (10YR 4/2 to 10YR 6/6). SAPROLITE		521
90												520
91		CME 18		60/60								519
92												518
93												517
94									SM	SAND silty (SM); (10YR 5/4 to 10YR 6/6); 75% sand; 25% silt. SAPROLITE		516
95												515
96		CME 19		58.8/58.8								514
97												513
98												512
99											Auger refusal at 98.4 ft; rock coring equipment lost in hole; moved 5 ft east; advanced casing to 100 ft; begin NQ coring on 4/1/06 MW-1204A on field log	511
100												510
101										Total Depth 98.4 ft. Groundwater encountered at 39 feet Borehole Grouted On 4/3/06		509
102												508
103												507
104												506
105												505
106												504
107												503
108												502
109												501
110												500
111												499
112												498
113												497
114												496
115												495
116												494
117												493
118												492
119												491
120												490

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1204A**	
Type and Diameter of Boring NQ core / 7.5 inch	Boring Location Cooling Tower Unit 2 N 1166132 E 1848026		Total Depth 135 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.6 feet MSL	Ground Water Depth 37.1 feet	Depth to Bedrock 104.6 feet
Casing Size and Depth 3.5 inch / 100 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 10	Date Started 4/1/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 4/3/06

Reviewed by / Date B. Reinicker 5/4/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
100–104		1	0.2/4.6	0	CW	R0 to R4		Drilled without sampling to 100 ft. See MW-1204 for soil description SAND, silty (ML); reddish yellow (7.5 YR 6/8); white to light gray quartzite fragment; equigranular; very coarse grained. SAPROLITE	Begin NQ coring on 4/1/06	509–504
105–109		2	1.3/5.0	0	CW to MW	R3		META-GRANODIORITE; white to dark gray (N 8 to 2.5Y 3/1); porphyroblastic; fine to coarse grained; reddish yellow to black staining; foliation 50°; hornblende, biotite, quartz, feldspars.		503–501
110–114		3	3.3/5.0	0	MW	R3		META-QUARTZ DIORITE		500–496
115–119		4	4.6/5.4	33	MW	R3		META-GRANODIORITE; bluish gray (10B 5/1); fine to medium grained; quartz and weathered plagioclase altered K-spar.	End of day 4/1/06 Begin day 4/2/06; water at 37.1 ft; changed from a 10 ft core barrel to a 5 ft core barrel	495–491
120–124		5	4.8/5.0	90	MW	R3		SAA; xenoliths, schist, scattered vugs; small dendritic manganese and iron staining. CONTINUOUS ROCK		490–486
125–129		6	5.0/5.0	100	SW to F	R3 to R4		META-DIORITE; fine to medium grained; thin laminated foliation; quartz, hornblende. META-GRANODIORITE; bluish gray; fine to medium grained; various thin fractures filled with calcite.		485–481
130–134		7	4.9/5.0	98	SW to F	R3 to R4				480–475
135–140								Total Depth 135 ft. Groundwater encountered at 37.1 feet Borehole Grouted On 4/3/06	End of drilling on 4/2/06 at 135 ft; boring terminated	474–470

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1205**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1165628 E 1848312		Total Depth 150 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.6 feet MSL	Ground Water Depth 43.9 feet	Depth to Bedrock 105.5 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 23	Date Started 3/4/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/17/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									GP	Crushed stones with fines.	Drilled without sampling to 3.5 ft.	609
1–3									ML	SILT, sandy (ML); red (10R 4/6); damp to dry; ~15% very fine to fine sand; non plastic; micaceous. FILL	Logged with auger cuttings	608–607
4–5		SPT 1	3 3 4	18/18								606–605
6–8		CME 1		27.6/42								604–602
9–13		CME 2		27.6/60						SAA; mottled with brownish yellow (10YR 6/6).		601–597
14–15		CME 3		18/18								596–595
16–20		CME 4		60/60						SILT, sandy (ML) SAA; yellowish brown (10YR 5/6); dry to damp; ~35% fine sand. FILL		594–590
21–24		CME 5		60/60								589–586
24–25									CL	CLAY, sandy (CL); red (10R 4/8); dry; hard; ~30% fine sand; low to medium plasticity; FILL		585
25–30		CME 6		60/60					ML	SILT, sandy (ML); brownish yellow (10YR 6/6); with zones of red (10R 4/8); dry to damp; ~35% fine sand; low plasticity to non plastic. FILL		584–580
30–33		CME 7		60/60					SM	SAND, silty (SM); yellow (10YR 7/8); moist; ~30% fines; poorly graded. FILL		579–577
33–35									ML	SILT, sandy (ML); yellowish brown (10YR 5/6); dry; low plasticity. FILL	End drilling 3/4/06 Begin drillilng on 3/5/06; water at 34.1 ft very wet zone 35 to 36.5 ft	576–575
35–40		CME 8		51.6/60							Dry 37.85 to 40 ft	574–570

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1205

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40										SILT, sandy (ML); yellowish brown (10YR 5/6); dry; low plasticity. FILL		569
41										*(Continued from previous page)*		568
42		CME 9		60/60						SAA; zones of red (2.5YR 4/8); dry.		567
43												
44									▽	Zone of subangular to angular 2 to 3 inch quartz fragments.		566
45										SAA; dark yellowish brown (10YR 4/6 to 10YR 3/6); damp to moist; fine to coarse sand composed of quartz and small rock fragments; trace gravel-sized rock fragments. FILL		565
46												564
47		CME 10		49.2/60								563
48											Hard drilling to hollow stem auger	562
49												561
50												560
51										SAA; red (10R 4/6) to dark yellowish brown (10YR 4/6); moist. FILL		559
52		CME 11		60/60								558
53												557
54												556
55												555
56										SAA; dark yellowish brown; rock fragments. FILL		554
57		CME 12		60/60								553
58												552
59												551
60												550
61										SAA; brownish yellow (10YR 6/8) to dark yellowish brown (10YR 4/6); trace gravel. FILL		549
62		CME 13		38.4/60								548
63												547
64												546
65												545
66										SAA; with some 1 to 2 inch diameter rock fragments. FILL		544
67		CME 14		60/60								543
68												542
69												541
70												540
71												539
72		CME 15		60/60								538
73												537
74												536
75												535
76		CME 16		32.4/32.4						SAA; red (10R 4/6). FILL		534
77												533
78												532
79		CME 17		27.6/27.6								531
80												530

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1205

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80										SILT, sandy (ML); yellowish brown (10YR 5/6); dry; low plasticity. FILL	End drilling 3/5/06	529
81										*(Continued from previous page)*	Begin drilling 3/6/06; water at 59.4 ft	528
82		CME 18		27.6/60						SAA; some zones containing 1 to 2 inch gravels; medium to coarse grained sand.	Hard drilling 80 to 85 ft	527
83												526
84												525
85												524
86		CME 19		36/36								523
87											Hard drilling 87 to 88 ft	522
88										Wood fragment at 88 ft.		521
89										Sandy zone with rock fragments from 89 to 90 ft.		520
90		CME 20		60/60						Decomposed wood fragment at 89 ft.	End drilling on 3/7/06	519
91											Begin drilling on 3/13/06	518
92												517
93											Wet soil 93 to 95.7 ft	516
94												515
95		CME 21		60/60								514
96									SM	SAND, silty (SM); (10YR 6/6, 2.5YR 4/8); moist.		513
97									SM	ALLUVIUM		512
98										SAND, silty (SM); yellow (10R 7/8); dry to damp; fine to medium grained; quartz poorly graded. RESIDUUM		511
99										SAA; (2.5Y 3/3); wet		510
100		CME 22		54/60					ML	SILT, (ML); olive brown (2.5Y 4/3); moist; <10% sand; non plastic; slight relict foliated rock texture. RESIDUUM		509
101										SAA; brownish yellow (2.5YR 6/6) 101.5 to 103 ft.		508
102												507
103											Hard drilling	506
104		CME 23		30/30								505
105											See rock log	504
106												503
107												502
108												501
109												500
110												499
111												498
112												497
113												496
114												495
115												494
116												493
117												492
118												491
119												490
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1205**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1165628 E 1848312		Total Depth 150 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 609.6 feet MSL	Ground Water Depth 43.9 feet	Depth to Bedrock 105.5 feet
Casing Size and Depth 3.5 inch / 105.5 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 10	Date Started 3/4/06
	Borehole Inclination -90	Logged by M. Cooke	Date Completed 3/17/06

Reviewed by / Date F. Syms 5/25/06

Reviewed by / Date M. Gray 10-22-07

Run No.	Recovery / Cut	% RQD	Weathering	Strength	Lithology	Remarks
1	1.9/3.5	29	MW SW	R3	META-GRANODIORITE; light bluish gray (10B 7/1); fine to medium grained; slight 60° foliation; quartz, feldspar; biotite; some veinlets of quartz and/or calcite; some pyrite mineralization along fractures; some fine grained muscovite; numerous vugs on surface of core lined with sulfides.	Auger refusal at 105.5 ft on 3/13/06 Begin drilling 3/14/06; water at 60.1 ft
2	4.9/5.0	40	MW HW MW	R3	Oxidized fracture 109.4 to 109.9 ft	100% water loss
			HW	R2 to R3	Oxidized fracture 111.3 to 113 ft	
			MW	R3		
3	3.5/5.0	20	MW	R2 to R3	Calcite mineralization along fractures 114.6 to 114.9 ft	
			HW	R2	Oxidized fracture zone 115.7 to 119 ft	
4	3.9/5.0	58	HW	R2	Highly weathered fracture zone 119 to 120.5 ft	
			SW to F	R3 to R4	Amphibolilte xenolith 120.5 to 120.9 ft; veinlets and stringers are lined with biotite; slight mylonitic structure	
			MW	R3	SAA. CONTINUOUS ROCK.	
5	5.0/5.0	86	MW to SW	R3 to R4	Quartz, plagioclase, hornblende, biotite	
6	5.0/5.0	77	MW to SW	R3 to R4	SAA. Epidote zone; plagioclase altered to epidote	End drilling 3/16/06 Begin drilling 3/17/06; water at 43.9 ft still losing water
7	5.0/5.0	69	SW to F	R3 to R4	META-GRANODIORITE	
8	5.0/5.0	74	F	R4		
					META-GRANODIORITE	

Depth (feet): 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145

Elevation (feet): 504, 503, 502, 501, 500, 499, 498, 497, 496, 495, 494, 493, 492, 491, 490, 489, 488, 487, 486, 485, 484, 483, 482, 481, 480, 479, 478, 477, 476, 475, 474, 473, 472, 471, 470, 469, 468, 467, 466, 465

Project Name and Job Number
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1205

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
146		9	5.0/5.0	90	F	R4		META-GRANODIORITE		464
147										463
148										462
149										461
150		10	1.0/1.0	83	F	R4				460
151									Coring terminated at 150 ft on 3/17/06	459
152										458
153								Total Depth 150 ft.		457
154								Groundwater encountered at 43.9 feet Borehole Grouted On 3/17/06		456
155										455
156										454
157										453
158										452
159										451
160										450
161										449
162										448
163										447
164										446
165										445
166										444
167										443
168										442
169										441
170										440
171										439
172										438
173										437
174										436
175										435
176										434
177										433
178										432
179										431
180										430
181										429
182										428
183										427
184										426
185										425

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1206**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1166650 E 1846689		Total Depth 93 feet
Drilling Contractor and Rig Gregg/Smith/311025 / CME 55	Elevation and Datum 589.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock 59 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 10	Date Started 4/2/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/4/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, trace sandy (ML) with trace clay; yellowish brown (10YR 5/4); moist; micaceous; and few small angular pieces gravel. FILL	Drilled without sampling to 3.5 ft observed auger cuttings	589–587
4–8		CME 1		60/60						SAA; but with variety of gravel small to large.		586–581
9–13		CME 2		60/60					ML	SILT, clayey, slightly sandy (ML); red (2.5YR 4/6); light gray (10YR 7/2); and yellowish brown (10YR 5/6); moist; damp; randomly varying lenses (interval). Large cobble of quartz zone 12 to 12.4 ft.		580–577
14–18		CME 3		60/60						SAA; more ribbed appearance along core; mostly stiff.		576–572
19–23		CME 4		60/60						SAA. FILL		571–567
24–28		CME 5		60/60								566–562
29–33		CME 6		60/60						SAA. FILL		561–557
34		CME 7		60/60					ML	SILT, sandy (ML); yellowish red (5YR 4/6); damp. RESIDUUM		556
35–38									ML	SILT, sandy (ML); light gray (10YR 7/2); damp; relict rock texture; lamination at ~30 to 0°; of manganese oxide staining. SAPROLITE		555–552
39–40												551–550

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1206

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												549
41		CME 8		54/60					ML	SILT, sandy to SAND silty; brownish yellow (10YR 6/6); foliation 30°; increasing grain size with depth; fine to medium sand; SAPROLITE		548
42												547
43									GM	GRAVEL (GM) quartz with silt; wet; angular; blocky. SAPROLITE		546
44									ML			545
45									ML	SILT, sandy (ML); yellowish red (5YR 4/6); damp. SAPROLITE		544
46		CME 9		49.2/60					SM	SILT, sandy to SAND silty; light gray (10YR 7/2) to brownish yellow (10YR 6/6); moist to wet. SAPROLITE		543
47												542
48										SAND and GRAVEL in SILT matrix (SM); damp to moist; quartz veins ~60°; foliation at ~30°. PARTIALLY WEATHERED ROCK.	Refusal at 49 ft.	541
49		CME 10		6/6						No sample collected		540
50												539
51												538
52												537
53												536
54											Advanced casing ~10 ft through PWR before start coring; no samples collected. Rock coring began at 59 ft See rock log	535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1206**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1166650 E 1846689		Total Depth 93 feet
Drilling Contractor and Rig Gregg/Smith/311025 / CME 55	Elevation and Datum 589.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock 59 feet
Casing Size and Depth 3.5 inch / 59 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 7	Date Started 4/2/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 4/4/06

Reviewed by / Date F. Syms 5/28/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
59–93		1	1.2/4.0	0	CW to MW	R0 to R2		META-GRANODIORITE; light gray (7.5YR 7/1); medium grained; some iron and manganese staining on fracture surfaces; kaolinitization of feldspar; quartz, feldspar, biotite, hornblende		530–527
63–68		2	3.8/5.0	0	CW to MW	R0 to R2		SAA; gray (10YR 6/1); feldspar weatheared with yellow stain; some schistocity (or phyllitic texture) noted		526–522
68–73		3	4.7/5.0	56	SW to MW	R3 to R4		META-GRANODIORITE; bluish gray (5B 5/1); medium grained; iron and manganese staining; pyrite on fractures surfaces; most incipient joints are quartz healed CONTINUOUS ROCK	Losing some water	521–517
73–78		4	4.9/5.0	64	SW to MW	R3 to R4		META-GRANODIORITE; quartz and calcite observed along incipient joints		516–512
78–83		5	5.0/5.0	75	SW to F	R3 to R4		SAA; some phyllictic texture; incipient joints with quartz and calcite; few vugs. CONTINUOUS ROCK.		511–507
83–88		6	5.0/5.0	100	SW to F	R4 to R5		SAA; some schistosity/gneissic foliation; quartz vein with some orange coloration; few diorite xenoliths throughout Gneissic foliation from 86.2 to 88 ft		506–502
88–93		7	5.0/5.0	100	SW to F	R4 to R5		SAA; dark bluish gray (10B 4/1); medium grained; extensive interconnected incipient joints; quartz, biotite, feldspar, and hornblende; mostly low angle incipient joints		501–497
93								META-DIORITE to HORNFELS SCHIST; black (N 2.5); fine grained to aphanitic	Coring terminated on 4/4/06	496
94–99										495–491

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1207**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location General site N 1166840 E 1846668		Total Depth 62 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 588.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Continuous Sampler/Standard	Sample Driving Hammer/Drop NA / NA	No. of Samples 21	Date Started 4/1/06
	Borehole Inclination -90	Logged by M. DePalma	Date Completed 4/1/06

Reviewed by / Date B. Reinicker 5/4/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, sandy (ML); red; dry. FILL		588–586
4–8		CME 1		30/60						SAA; red brown (2.5YR 4/6); dry; micaceous; gravel at bottom of sample.		585–581
9–13		CME 2		43/60					ML	SILT, sandy (ML); reddish brown (2.5YR 5/3); dry; mica; stratifications of white. FILL		580–576
14–18		CME 3		60/60						SAA; brown red (10YR 3/6); dry; slight mica; gravel fragment throughtout; mottled white and light red. FILL		575–571
19–22		CME 4		42/60								570–567
23–28		CME 5		46/60					SC	SAND, clayey (SC); green gray (5Y 5/1); damp; micaceous; organics from 23 to 23.5 ft. FILL Organics present; fine to medium grained		566–562
29–33		CME 6		37/60					SM	SAND, silty (SM); yellow green gray (2.5Y 5/3); wet to moist; fine to medium grained; micaceous; quartz fragment at bottom. RESIDUUM		560–556
34–38		CME 7		41/60						SAA; less moisture		555–551
39–40												550–549

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1207

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												
41		CME 8		24/60						SAND, silty (SM); yellow green gray (2.5Y 5/3); wet to moist; fine to medium grained; micaceous; quartz fragment at bottom. RESIDUUM *(Continued from previous page)*		548
42												547
43										SAA; medium to coarse grained.		546
44												545
45												544
46		CME 9		31/60								543
47												542
48												541
49												540
50												539
51		CME 10		24/60								538
52												537
53												536
54												535
55										SAA. RESIDUUM		534
56		CME 11		21/60								533
57												532
58												531
59												530
60		CME 12		26/42								529
61												528
62												527
63											Auger refusal at 62 ft on 4/1/06, moved 4 ft south and used NQ core barrel to drilled to 87 ft. See MW-1207A	526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												509

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389			**SOIL LOG - Boring No. MW-1207A**
Type and Diameter of Boring Wash Rotary / NQ core	Boring Location General site N 1166836 E 1846666		Total Depth 133.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 588.8 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock 108.5 feet
Sampling Method Rock core/SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 14	Date Started 4/3/06
	Borehole Inclination -90	Logged by M. DePalma	Date Completed 4/4/06

Reviewed by / Date B. Reinicker 5/4/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drilled without sampling to 62 ft. See MW-1207		588
1												587
2												586
3												585
4												584
5												583
6												582
7												581
8												580
9												579
10												578
11												577
12												576
13												575
14												574
15												573
16												572
17												571
18												570
19												569
20												568
21												567
22												566
23												565
24												564
25												563
26												562
27												561
28												560
29												559
30												558
31												557
32												556
33												555
34												554
35												553
36												552
37												551
38												550
39												549
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1207A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40–61										Drilled without sampling to 62 ft. See MW-1207 *(Continued from previous page)*		548–528
62–67		CORE 1		10/60					SC	SAA; gray (10YR 5/2); medium to coarse grained sand. PARTIALLY WEATHERED ROCK	Begin NQ coring	527–522
67–72		CORE 2		0/60						No recovery.		521–517
72–77		CORE 3		0/60						No recovery.		516–512
77–80		CORE		0						No recovery.		511–509

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1207A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80		4		60						No recovery. *(Continued from previous page)*		508
81												507
82										No recovery.		506
83												505
84		CORE		0								504
85		5		60								503
86												502
87		SPT 1	50/3	3/3					SC	SAND, clayey (SC); gray tan (10YR 5/2); wet; medium to coarse grained. PARTIALLY WEATHERED ROCK	Coring terminated at 87 ft, used SPT sampler to 108.5 ft SPT HAMMER WEIGHT NOT CERTIFIED-SPT BLOWS FOR INFORMATION ONLY	501
88												500
89												499
90												498
91		SPT 2	50/3	2/3								497
92												496
93												495
94		SPT 3	50/2	2/2								494
95												493
96		SPT 4	50/6	6/6						SAA; orange brown (7.5YR 6/6); moist; finer grained than previous sample.		492
97												491
98												490
99		SPT 5	16 20 30	13/18						SAA; less clay, more silt; medium to fine grained.		489
100												488
101		SPT 6	41 50/5	10/11					SM	SAND, silty (SM); orange brown (7.5YR 6/6); moist; fine to medium grained; mottled black, brown, micaceous.		487
102												486
103		SPT 7	50/4	3/4								485
104												484
105		SPT 8	41 50/3	4/9						SAA; more clay content. PARTIALLY WEATHERED ROCK	SPT refusal at 108.5 ft, see rock log	483
106												482
107												481
108		SPT 9	50/1	1/1								480
109												479
110												478
111												477
112												476
113												475
114												474
115												473
116												472
117												471
118												470
119												469
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1207A**	
Type and Diameter of Boring Wash Rotary / NQ core	Boring Location General site N 1166836 E 1846666		Total Depth 133.5 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 588.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock 108.5 feet
Casing Size and Depth 4 inch / 97 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 3	Date Started 4/3/06
	Borehole Inclination -90	Logged by M. DePalma	Date Completed 4/4/06

Reviewed by / Date B. Reinicker 5/4/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
109		1	4.5/5.0	22	HW	R0		META-GRANODIORITE; bluish gray (5PB 7/1)	SPT refusal at 108.5 ft, see soil log	480
110								Quartz dike from 109.5 to 110.5 ft		479
111					MW	R1 to R2		SAA; bluish gray (5PB 7/1); biotite slightly foliated 30 to 45°; micaceous; several incipient fractures throughout		478
112										477
113										476
114		2	3.2/5.0	44	MW	R2		Vugs from 114 to 115 ft		475
115										474
116										473
117										472
118										471
119		3	4.7/5.0	50	HW	R1		Quartz fragment		470
120								Gneiss layer; dark gray (N 3); foliated 30 to 45° from 119 to 122 ft; incipient fractures throughout		469
121										468
122					HW to MW	R1 to R2				467
123								META-GRANODIORITE; bluish gray (N 3); biotite foliated 30 to 45°		466
124		4	5.0/5.0	97	MW to SW	R2 to R4		SAA. CONTINUOUS ROCK.		465
125										464
126										463
127										462
128										461
129		5	5.0/5.0	83	SW to F	R3 to R4		SAA. quartz fragment		460
130								Quartz vein		459
131										458
132										457
133										456
134									Borehole terminated at 133.5 on 4/4/06	455
135										454
136										453
137										452
138										451
139										450
140										449
141										448
142										447
143										446
144										445
145										444
146										443
147										442
148										441

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1208**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1167184 E 1846588		Total Depth 139.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 587.1 feet MSL	Ground Water Depth 38.2 feet	Depth to Bedrock 59.3 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 12	Date Started 3/27/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3										Topsoil over gravel and sand	Observed auger cuttings to classify above top of first CME sample.	587–585
2–3									MH	SILT (MH); dusky red (2.5YR 3/2); dry; <10% sand and/or gravel; decomposing roots. FILL		585–584
4–8		CME 1		60/60					ML	SILT, sandy (ML); pale red (10R 6/3); dry; <30% sand; layers of gravel and sand; some weathered rock pieces; roots. FILL		583–579
9–13		CME 2		60/60								578–574
14–18		CME 3		60/60					SM	SAND, silty (SM); pale red (10R 6/4); dry; fine to medium grained; 5 to 12% silt.		573–571
									ML	SILT, sandy (ML); red (10R 4/6); damp; low to non plastic; fine sand; quartz. FILL		570–569
19–23		CME 4		60/60								568–565
23–28		CME 5		50.4/60					SM	SAND, silty (SM); red (10R 4/6) to yellowish red (5YR 5/8) to reddish brown (5YR 4/3); dry to damp; some clayey silt; micaceous; trace roots. FILL		564–559
29–33		CME 6		33.6/60								558–554
34–38		CME 7		60/60							Saturated soil encountered	553–549
39–40									ML	SILT sandy (ML); wet; fine to medium sand; clayey deposits; quartz; RESIDUUM		548

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1208

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40–43		CME 8		52.8/60					SM	SAND, silty (SM); white (10YR 8/1), mottled with very dark brown (10YR 2/2); wet to moist; fine to coarse grained. SAPROLITE		547–544
44–48		CME 9		44.4/60								543–539
49–53		CME 10		44.4/60								538–534
54–57		CME 11		46.8/60						SAA; strong brown (7.5YR 5/6); some silt from 55 to 57.5 ft.		533–530
58–59		CME 12		9.6/9.6						SAA; white (10 YR 8/1), mottled with very dark brown (10 YR 2/2); wet to damp; coarse quartz fragments. SAPROLITE	CME refusal at 59.3 ft on 3/27/06, see rock log	529–528
60–80												527–508

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1208**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1167184 E 1846588		Total Depth 139.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 587.1 feet MSL	Ground Water Depth 38.2 feet	Depth to Bedrock 59.3 feet
Casing Size and Depth 3.5 inch / 59.3 feet	Length of Core Barrel and Bit 13 feet	No. of Core Boxes 4	Date Started 3/27/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/29/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
60		1	1.2/5.0	0	CW	R0 to R1		META-GRANODIORITE; with quartz fine grained	Begin core drilling on 3/28/06; water level at 47 ft Lost water recirculation	527
61										526
62										525
63					MW	R3				524
64					CW	R0 to R1				523
65		2	1.0/5.0	0	CW	R0 to R1			Still losing some water circulation (approx. 200 gallons per 5 ft run)	522
66										521
67					MW	R3 to R4				520
68					CW	R0 to R1				519
69					HW to CW	R0 to R1				518
70		3	4.2/5.0	20						517
71					MW	R2 to R3				516
72										515
73										514
74					HW	R0 to R1				513
75		4	1.2/4.0	0	CW to HW	R0 to R3		Quartz veins	Still losing some water circulation (200 gallons per 4 ft.)	512
76										511
77										510
78										509
79		6	2.5/4.0	33	CW to HW	R0 to R3		META-GRANODIORITE; fine grained; pyrite; meta-diorite xenoliths		508
80										507
81								No recovery 80.2 to 82.4 ft		506
82										505
83		7	2.0/2.0	30	CW to HW	R0 to R3		META-GRANODIORITE; fine grained; pyrite; meta-diorite xenoliths		504
84										503
85		8	4.7/5.0	46	CW to HW	R0 to R3				502
86										501
87										500
88										499
89										498
90		9	5.0/5.0	56	CW to HW	R0 to R3		META-GRANODIORITE		497
91										496
92										495
93										494
94								Quartz vein		493
95		10	5.0/5.0	60	CW to HW	R0 to R3				492
96										491
97										490
98								Dike 98 to 98.8 ft		489
99										488

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1208

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
11	1.7/5.0	8	CW to HW	R0 to R3		Dike 99 to 99.3 ft	
12	5.0/5.0	52	CW to HW	R0 to R3			
13	3.9/5.0	50	MW to SW	R3 to R4		META-GRANODIORITE; bluish gray (5B 5/1); fine to medium grained; quartz; pyrite; manganese oxide staining	End drilling 3/28/06 Begin drilling 3/29/06; water at 38.2 ft
			CW to HW	R2		Xenolith of meta-diorite Vugs, iron and manganese oxide staining BIOTITE SCHIST; greenish black (10Y 2.5/1); fine grained	
14	2.3/5.0	10	CW to HW	R2			
			MW to SW	R4		META-GRANODIORITE; bluish gray (5B 5/1); xenolith schist	
15	2.7/5.0	40	CW	R0 to R1			
			F	R3 to R4		META-DIORITE; black (N 2.5); fine grained; iron staining	
16	4.9/5.0	98	F	R3 to R4		SAA. CONTINUOUS ROCK.	
17	4.9/5.0	98	F	R3 to R4		Poorly developed foliation META-GRANODIORITE; bluish gray (5B 5/1); medium grained	
18	5.0/5.0	80	F	R3 to R4		SAA	

Depth (feet): 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139

Elevation (feet): 487, 486, 485, 484, 483, 482, 481, 480, 479, 478, 477, 476, 475, 474, 473, 472, 471, 470, 469, 468, 467, 466, 465, 464, 463, 462, 461, 460, 459, 458, 457, 456, 455, 454, 453, 452, 451, 450, 449, 448

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1208

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
140									Boring terminated at 139.3 ft on 3/29/06	447
141									Boring terminated at 139.3 ft on 3/29/06	446
142								Total Depth 139.3 ft.		445
143								Groundwater encountered at 38.2 feet		444
144								Borehole Grouted On 3/29/06		443
145										442
146										441
147										440
148										439
149										438
150										437
151										436
152										435
153										434
154										433
155										432
156										431
157										430
158										429
159										428
160										427
161										426
162										425
163										424
164										423
165										422
166										421
167										420
168										419
169										418
170										417
171										416
172										415
173										414
174										413
175										412
176										411
177										410
178										409
179										408

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1209**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1165080 E 1848078		Total Depth 125.5 feet
Drilling Contractor and Rig Gregg/Smith/311025 / CME 55	Elevation and Datum 586.6 feet MSL	Ground Water Depth 51.5 feet	Depth to Bedrock 83.1 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 16	Date Started 3/28/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 3/31/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML	SILT, trace sand, trace clay (ML); brownish yellow (10YR 6/8); dry to damp; low plasticity; some small to medium gravel; few inches of organic topsoil at top. FILL	Observed auger cuttings to classify above top of first CME sample.	586–584
4–8		CME 1		18/60					ML	SILT, sandy (ML); trace clay; yellowish brown (10YR 5/8); dry to damp; with some angular to subangular gravel and saprolite clasts. FILL		583–579
9–12		CME 2		24/60					SP-SM	SAND, silty, gravely (SP-SM); brownish yellow (10YR 6/8); dry to damp; gravel is small to large; fine sand; quartz subrounded. FILL		578–575
13									ML	SILT, clayey (ML); yellowish brown (10YR 5/8); mottled with olive (5YR 5/4); damp; micaceous; fine laminations and lenses of varying density. FILL		574
14–15		CME 3		60/60					SM ML	SAND, silty (SM); light yellowish brown (10YR 6/4); damp. FILL		573–572
16									SW	SILT (ML); brown (7.5YR 5/4); damp. FILL		571
17									ML	SAND, gravely (SW); yellow (10YR 7/6); damp to dry. FILL		570
18									SM	SILT, (ML); brown (7.5YR 5/4); damp. FILL		569
19										SAND, silty (SM); light yellowish brown (10YR 6/4); damp. FILL		568
20–23		CME 4		60/60					ML	SILT, (ML); brown (7.5YR 5/4); with intervals of silt and silty sand. Quartz clasts from 20.8 to 21 ft SAA; moist to wet silty sand interval		567–564
24–28		CME 5		60/60						SAA; brown (7.5YR 5/4); moist. FILL		563–559
29									SM	SAND, silty (SM); brown (7.5YR 5/2); wet. FILL		558
30–33		CME 6		60/60					ML	SILT, (ML); strong brown (7.5YR 5/6); moist; soft; with large saprolite and rock clasts. FILL		557–554
34									SM	SAND, silty (SM); strong brown (7.5YR 5/6); wet. FILL		553
35–38		CME 7		60/60					ML	SILT (ML); light brown to gray (10YR 6/2); moist; with organics. FILL SAA; no organics SAA; strong brown (7.5YR 5/6); moist to damp. FILL		552–549
39–40									ML	SILT, sandy (ML); yellowish brown (10YR 5/6); moist to damp. FILL		548–547

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1209

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												546
41		CME 8		60/60						SILT, sandy (ML); yellowish brown (10YR 5/6); moist to damp. FILL *(Continued from previous page)* SAA; yellowish brown (10YR 3/6); large roots in fill		545
42												544
43									SP	SAND (SP); yellowish brown (10YR 5/4); trace clay; damp; FILL		543
44									ML	SILT (ML); red (2.5YR 5/6); damp. FILL SAA; wet 43.5 to 44.3 ft, then moist		542
45												541
46		CME 9		60/60								540
47												539
48												538
49										SAA; wet from 48.5 to 48.8 ft.		537
50												536
51		CME 10		60/60					∇			535
52										Quartz clasts interval.		534
53												533
54										SAA; wet from 53.5 to 56 ft. FILL		532
55												531
56		CME 11		50.4/60								530
57										SILT slightly sandy (ML); brown to dark brown (10YR 4/3); moist; organics. ALLUVIUM		529
58												528
59									ML	SILT, sandy (ML); with abundant organics, roots and large rounded to subrounded gravels. ALLUVIUM	End of drilling 3/29/06 Begin drilling 3/30/06; water at 51.5 ft	527
60												526
61		CME 12		60/60								525
62												524
63												523
64												522
65												521
66		CME 13		44.4/60					CH	CLAY, sandy (CH); very dark grayish brown (10YR 3/2); wet. ALLUVIUM		520
67									SW	SAND, gravely (SW); gray (2.5Y 5/1); wet; fine to medium quartz gravel. ALLUVIUM		519
68												518
69									GW	SAND, gravely (SW-GW); coarse sand with very large gravel and cobbles at 69.1 ft; gravel is quartz, epidote and granite subangular to angular. ALLUVIUM		517
70									GM			516
71		CME 14		49.2/60					ML	GRAVEL silty, clayey; light gray (5Y 7/1); moist; gravel consist of weathered rock fragments. SAPROLITE		515
72												514
73												513
74									ML	SILT, clayey (ML); olive (5Y 4/3); grading to yellowish brown (10YR 5/8); moist; foliated with relict rock texture; micaceous; SAPROLITE		512
75										SILT, (ML); olive (5Y 4/3); yellowish brown (10YR 5/8) to 76.5 ft; micaceous; manganese oxide staining.		511
76		CME 15		56.4/60								510
77												509
78												508
79												507
80												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1209

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80		CME 16		45.6 / 45.6						SILT, (ML); olive (5Y 4/3); yellowish brown (10YR 5/8) to 76.5 ft; micaceous; manganese oxide staining. *(Continued from previous page)*	See rock log	506
81												505
82												504
83												503
84												502
85												501
86												500
87												499
88												498
89												497
90												496
91												495
92												494
93												493
94												492
95												491
96												490
97												489
98												488
99												487
100												486
101												485
102												484
103												483
104												482
105												481
106												480
107												479
108												478
109												477
110												476
111												475
112												474
113												473
114												472
115												471
116												470
117												469
118												468
119												467
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1209**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location General site N 1165080 E 1848078		Total Depth 125.5 feet
Drilling Contractor and Rig Gregg/Smith/311025 / CME 55	Elevation and Datum 586.6 feet MSL	Ground Water Depth 51.5 feet	Depth to Bedrock 83.1 feet
Casing Size and Depth none / 82.3 feet	Length of Core Barrel and Bit 5.2 feet	No. of Core Boxes 2	Date Started 3/28/06
	Borehole Inclination -90	Logged by J. Martin	Date Completed 3/31/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
83				CW	R0		No recovery	Hollow stem auger refusal at 82.3 ft on 3/30/06 Begin drilling 3/31/06 Losing water	504
84–86	1	4.0/4.7	7	SW to F	R3 to R4		META-GRANODIORITE; light gray (10YR 7/1); medium grained; pyrite visible; feldsar, quartz, biotite, and hornblende		503–501
87–91	2	1.2/5.0	0	SW to CW	R0 to R4		META-GRANODIORITE; gray (5Y 6/1); medium grained with pyrite; feldspar, quartz, hornblende, biotite, vuggy		500–495
92–96	3	0.1/5.0	0	CW	R0 to R3			Low recovery zone; partially weathered rock	494–490
97–101	4	0.0/5.0	0	CW	R0				489–485
102–105	5	1.8/4.0	15	SW to CW	R0 to R3				484–481
106–110	6	0.9/5.0	0	SW to CW	R0 to R3		META-DIORITE; black (2.5Y 2.5/1); fine grained; some pyrite on fracture faces; phyllitic/shistose texture Interval of vuggy phyllite about 2 inch thick	Low recovery zone; partially weathered rock	480–476
111–113	7	4.6/5.0	44	SW to F	R2 to R4		SAA; gray (5Y 6/1); grain size lost to schistosity; increase mica. META-GRANODIORITE; Bluish gray (5B 5/1); medium to coarse grained; pyllitic; feldspar, quartz, hornblende, biotite		475–473
114–121	8	5.0/5.0	100	F	R4 to R5		SAA; slight color change to pinkish yellow of feldspar due to alteration. CONTINUOUS ROCK. SAA.		472–465
122									

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1209

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
123		9	4.5/4.5	100	F	R4 to R5		SAA.		464
124										463
125										462
126									Coring terminated on 3/31/06	461
127										460
128								Total Depth 125.5 ft.		459
129								Groundwater encountered at 51.5 feet		458
130								Borehole Grouted On 4/2/06		457
131										456
132										455
133										454
134										453
135										452
136										451
137										450
138										449
139										448
140										447
141										446
142										445
143										444
144										443
145										442
146										441
147										440
148										439
149										438
150										437
151										436
152										435
153										434
154										433
155										432
156										431
157										430
158										429
159										428
160										427
161										426
162										425

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1210**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location Unit 2 adjacent N 1165324 E 1847451		Total Depth 38 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 589.4 feet MSL	Ground Water Depth 15 feet	Depth to Bedrock N/A
Sampling Method Continuous Sampler/Standard	Sample Driving Hammer/Drop NA / NA	No. of Samples 23	Date Started 3/20/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/20/06

Reviewed by / Date F. Syms 5/20/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									ML		Drilled with hollow stem auger to 3.5 ft; classified auger cuttings.	589–586
4–8		CME 1		60/60						SILT sandy (ML); red (10R 5/6); damp; medium stiff; <15% sand; <15% clay; medium plasticity; mottled; some roots; FILL		585–581
9–13		CME 2		60/60						SAA; red (2.5YR 4/6) to strong brown (7.5R 5/6); damp; <10% clay; <15% sand; occasional angular gravel. FILL		580–576
14–18		CME 3		60/60					ML ∇	SILT clayey (ML); red (2.5YR 4/8); damp; high plasticity; poorly graded		575–571
19–23		CME 4		44.4/60					ML	SILT sandy (ML); reddish brown (5YR 5/6); wet; <15% sand; <10% clay; thick black manganese oxide along broken surfaces. RESIDUUM SAA; damp		570–566
24–28		CME 5		60/60						SAA; yellowish red (5YR 5/6); damp. RESIDUUM		565–561
29–31		CME 6		42/60					ML	SILT sandy (ML); yellow (10YR 7/6); damp; <15% sand; <10% clay; relic rock texture; SAPROLITE SAA; wet; low plasticity; >30% sand; <10% clay. SAPROLITE		560–558
32–33									ML	SILT clayey (ML); white (2.5Y 8/0).SAPROLITE		557–556
34–38		CME 7		39.6/54					ML	SILT sandy (ML); very pale brown (10YR 7/2 to 7/3) to light gray (10YR 8/1 to 7/1); very moist to damp; low plasticity; relict texture of meta igneous rock. SAPROLITE	End of drilling 3/20/06; water level at 15 ft. See MW-1210A.	555–552
39–40												551–550

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1210

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												549
41										Total Depth 38 ft.		548
42										Groundwater encountered at 15 feet		547
43										Borehole Grouted On 6/12/06		546
44												545
45												544
46												543
47												542
48												541
49												540
50												539
51												538
52												537
53												536
54												535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69												520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1210A**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 adjacent N 1165324 E 1847455		Total Depth 126.3 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 589.4 feet MSL	Ground Water Depth 16.6 feet	Depth to Bedrock 96.3 feet
Sampling Method Rock core/SPT	Sample Driving Hammer/Drop 140 lbs / 30 inches	No. of Samples 19	Date Started 3/21/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/23/06

Reviewed by / Date F. Syms 5/20/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Drilled without sampling to 38 ft. See MW-1210		589
1												588
2										No recovery; drilled with NQ core barrel		587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10												579
11												578
12												577
13												576
14												575
15												574
16									∇			573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38										No recovery; drilled with NQ core barrel	Begin drilling NQ core barrel 3/22/06	551
39				0								550
40												

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1210A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40–41		CORE		48						No recovery; drilled with NQ core barrel		549–548
42–45		CORE		0/60						No recovery; drilled with NQ core barrel		547–543
47–50		CORE		0/60						No recovery; drilled with NQ core barrel		542–538
52–53		SPT 1	5 4 6	12/24					ML	SILT sandy (ML); brownish yellow to white (10YR 6/6 to 10YR 8/1); damp; <15% sand; poorly graded; low to medium plasticity. SAPROLITE	Started SPT sampler	537–536
54–56		SPT 2	4 8 9	19.2/24						SILT sandy, gravelly (ML); white (2.5YR 8/1) to yellow (10YR 7/6); damp; >30% sand; <15% clay; fine to coarse sand. SAPROLITE		535–531
59–60		SPT 3	3 6 13	18/18						SAA; pale yellow (5Y 7/2 to 7/3) to olive yellow (2.5Y 6/6), with white (2.5Y 8/1) damp; >30% sand, <15% clay; relict rock texture. SAPROLITE		530–526
64–65		SPT 4	7 8 11	16.8/18						SILT sandy (ML); white to yellow (2.5Y 8/1 to 2.5Y 7/4); damp; <20% sand; <15% clay; poorly graded; relict rock texture. SAPROLITE		525–521
69–70		SPT 5	9 12 21	18/18								520
71											End of day 3/21/06 Begin day 3/22/06; water at16.5 ft	519–518
72–73		SPT 6	21 30 35	16.8/18						SAA; white to dark yellowish brown (10YR 8/1 to 10YR 4/4); damp; sand ~40%, clay <10%; fine grained sand. SAPROLITE		517–516
74–75		SPT 7	22 25 38	16.8/18						SAA; fine to medium grained; micaceous		515–514
77–78		SPT 8	9 19 31	18/18						SAA; white to dark yellowish brown (10YR 8/1 to 10YR 3/4); damp; sand ~ 40 to 50%; <10% clay; fine grained; relict foliation 60° dip; micaceous. SAPROLITE		513–511
79–80		SPT	6 9	21.6					ML	SILT clayey (ML); dark yellowish brown (10YR 3/4);		510

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1210A

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80		9	15	18					ML	damp; <15% clay; very poorly graded; low plasticity; micaceous. SAPROLITE		509
81												508
82		SPT 10	5 7 14	18/18						SAA; dark grayish brown (10YR 4/4 to 3/2); damp. SAPROLITE		507
83												506
84		SPT 11	7 12 17	18/18								505
85												504
86												503
87		SPT 12	7 11 18	16.8/18					ML	SILT (ML); dark olive gray (5Y 3/2); damp; <5% sand; <10% clay; relict texture; several thin white veins. SAPROLITE		502
88												501
89		SPT 13	9 12 22	18/18						SAA; very dark grayish brown (2.5Y 3/2); damp; <10% sand or clay; relict foliation 55°. SAPROLITE		500
90												499
91												498
92		SPT 14	21 25 50	18/18						SAA; sub vertical iron stained vein (0.5 cm). SAPROLITE		497
93												496
94		SPT 15	11 21 30	15.6/18					ML	SILT sandy, gravelly (ML); very dark grayish brown (2.5Y 3/2); mottled with red, white and black manganese; damp; fine to coarse sand <15%; fine to medium grained gravel <10%; non plastic. SAPROLITE	96.3 ft started NQ coring - See rock log.	495
95												494
96		SPT 16	50/2	1.8/2					ML	SILT sandy, gravelly (ML); black; dark yellowish brown and white (2.5Y 2/1, 10 YR 4/6, 2.5Y 8/1); damp. PARTIALLY WEATHERED ROCK		493
97												492
98												491
99												490
100												489
101												488
102												487
103												486
104												485
105												484
106												483
107												482
108												481
109												480
110												479
111												478
112												477
113												476
114												475
115												474
116												473
117												472
118												471
119												470
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1210A**	
Type and Diameter of Boring Wash Rotary / NQ core / 3 inch	Boring Location Unit 2 adjacent N 1165324 E 1847455		Total Depth 126.3 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 589.4 feet MSL	Ground Water Depth 16.6 feet	Depth to Bedrock 96.3 feet
Casing Size and Depth 3.75 inch / 96.3 feet	Length of Core Barrel and Bit 8 feet	No. of Core Boxes 6	Date Started 3/21/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/23/06

Reviewed by / Date F. Syms 5/20/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
97–101		11	2.0/5.0	28	F	R4 to R5		META-GRANODIORITE; light gray (5YR 7/1); coarse, crystalline; probably pegmatite vein; manganese dendritic formation and white mica on fracture surfaces; minor rounded inclusions of intrusive dark igneous rocks.	Started NQ coring 7/22/06 100% water loss	493–489
102–106		12	4.9/5.0	78	F	R3 to R4		META-GRANODIORITE (MICA SCHIST); black (7.5YR 2.5/1) with white (7.5YR 8/1) veins of calcite; equigranular; fine to coarse grained; strong foliation 45°; mica present and possible chlorite, minor pyrite. CONTINUOUS ROCK.		488–484
107–111		13	5.0/5.0	84	F	R4		META-DIORITE; with thick (1 to 1.5 ft) quartzite veins; low angle 10° laminations of calcite crosscut 45° to foliation; pyrite is parallel to the low angle calcite veins		483–479
112–116		14	5.0/5.0	100	F	R5		META-DIORITE; white, black, and greenish black; hornblende (diopside); abundant calcite, feldspar (albite?), quartz, epidote and chlorite in lower part Migmatite texture from 112 to 115 ft Minor pyrite	End of day 3/22/06 Begin day 3/23/06; water at 16.6 ft Still losing all coring water	478–474
117–121		15	5.0/5.0	86	SW to F	R4		META-DIORITE with epidote, chlorite, garnet (?), orthoclase and calcite Red and green assemblages of minerals: epidote, calcite, chlorite, garnet from 116.7 to 117.8 ft META-GRANODIORTE; with light gray mica, quartz and feldspar, xenoblastic porphyroblastic, microcrystalline to coarse grained mafic minerals, mica, chlorite, hornblende very fine grained		473–468
122–126		16	5.0/5.0	86	SW to F	R4		Becomes increasingly foliated and sheared; mylonitized; chlorite filling shears along foliations, completely healed.		467–464
127–136								Total Depth 126.3 ft. Groundwater encountered at 16.6 feet Borehole Grouted On 6/12/06	Coring terminated on 3/23/06	463–454

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1211**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location Unit 1 adjacent N 1165196 E 1846389		Total Depth 65.5 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 589.3 feet MSL	Ground Water Depth 21.5 feet	Depth to Bedrock 12.5 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 3	Date Started 3/13/06
	Borehole Inclination -90	Logged by J. Cerceo/E. Weldon	Date Completed 3/16/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0										Topsoil		589
1									SP-SM	SAND, gravelly (SP-SM); light brown (7.5YR 6/4); dry; fine to coarse grained; ~30% gravel; FILL		588
2		CME 1		56.4 / 60								587
3									ML	SILT, sandy (ML); reddish brown (2.5YR 5/4); dry; 15% sand; some gravel zones; FILL		586
4									SM	SAND, silty (SM); light brown (7.5YR 6/4); dry; fine to coarse grained; with some gravel zones; FILL		585
5												584
6												583
7		CME 2		27.6 / 60					SP	SAND, gravelly (SP); very pale brown (10YR 7/3); dry; fine to coarse; ~35% gravel, ~10% silt; FILL		582
8												581
9									ML	SILT, sandy (ML); red (2.5YR 4/6); dry to damp; fine sand; trace clay; some gravel; FILL		580
10												579
11		CME 3		27.6 / 30							End of CME sampling See rock log Begin rock coring, see rock log	578
12									SM	SAND, silty (SM); gray (5YR 6/1); wet; fine to medium grained; trace gravel; FILL		577
13												576
14												575
15												574
16												573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1211**	
Type and Diameter of Boring CME Sampler / 7 inch/NQ	Boring Location Unit 1 adjacent N 1165196 E 1846389		Total Depth 65.5 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 589.3 feet MSL	Ground Water Depth 21.5 feet	Depth to Bedrock 12.5 feet
Casing Size and Depth 3.5 inch / 13 feet	Length of Core Barrel and Bit 8.1 feet	No. of Core Boxes 4	Date Started 3/13/06
	Borehole Inclination -90	Logged by J. Cerceo/E. Weldon	Date Completed 3/16/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
13	1	0.0/1.0	0	CW			META-GRANODIORITE; with quartzite vein (4 inch) light to medium gray; equigranular		576
14–15	2	2.5/2.5	60	SW	R3		META-QUARTZ DIORITE; medium gray; schistose (micas aligning in planes); upper one foot more weathered and higher K-spar content		575–574
16–20	3	5.0/5.0	92	SW to F	R3 to R4		SAA; gray; coarse equigranular; schistose to mylonitized texture		573–569
21–24	4	5.0/5.0	60	SW to F	R3 to R4		∇ META-QUARTZ DIORITE; medium gray; coarse equigranular; slightly schistose		568–566
25–29	5	4.8/5.0	38	SW to HW	R2 to R3		META-GRANODIORITE; above contact with meta-quartz diorite gradual; increase in K-spar SAA; very pale brown (10YR 7/3); to white (10YR 8/1); fine to coarse equigranular to migmatite		565–560
30–34	6	4.1/5.0	54	F	R4 to R5		META-QUARTZ DIORITE; above contact with meta-granodiorite transitional within 0.5 ft noted by increase in quartz and decrease in orthoclase and light pink to medium gray META-QUARTZ DIORITE; gray (N 6); fine to medium grained; closed to moderately spaced healed joints/fractures	End of day 3/14/06 Begin day 3/15/06	559–554
35–39	7	4.2/4.4	64	SW to MW	R3		SAA; mylonitized shears are often conjugate pairs or subvertical; calcite crystallized along shears		553–550
40–44	8	4.9/5.0	82	SW to F	R3 to R4		SAA; but more inclusions (mafic and felsic) CONTINUOUS ROCK		549–545
45–50	9	4.9/5.0	100	SW	R3				544–539
51–52								End of day 3/15/06 Begin day 3/16/06; water level 21.5 ft	538–537

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1211

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
53		10	5.0/5.0	82	SW	R4				536
54										535
55								META-GRANODIORITE; gray; fine to coarse grained		534
56										533
57						R4				532
58		11	5.0/5.0	100	SW to F					531
59						R3 to R4				530
60								META-DIORITE; medium to dark gray, fine to coarse grained; foliation dips ~10°; with quartz; plagioclase, and minor orthoclase		529
61										528
62										527
63		12	4.9/5.1	80	SW to F	R3				526
64										525
65										524
66									Coring terminated on 3/16/06	523
67										522
68								Total Depth 65.5 ft.		521
69								Groundwater encountered at 21.5 feet		520
70								Borehole Grouted On 3/17/06		519
71										518
72										517
73										516
74										515
75										514
76										513
77										512
78										511
79										510
80										509
81										508
82										507
83										506
84										505
85										504
86										503
87										502
88										501
89										500
90										499
91										498
92										497

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1212**	
Type and Diameter of Boring CME Sampler / 8 inch	Boring Location Unit 1 CT N 1165375 E 1845450		Total Depth 22 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 609.7 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 4	Date Started 3/18/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/19/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–8									GP SM	GRAVEL sandy, silty (GP); gray (N 6); dry; fine. FILL SAND silty (SM); yellowish red (5YR 5/8); dry; fine to medium grained; >15% silt; little fine gravel with trace clay and rock fragments. FILL		609–602
4–8		CME 1		33.6/60								
8–16		CME 2		52.8/60					ML	SILT sandy (ML); strong brown (7.5YR 5/6); damp; fine to medium grained; sand >30%; fine gravel <5%; low plasticity; micaceous. SAPROLITE	End drilling 3/18/06 Begin drillling 3/19/06; no water encountered	601–596
14–16		CME 3		22.8/60								
16–18									SM	SAND silty (SM); brownish yellow (10YR 6/8); dry to damp; fine to medium grained; <10% silt; micaceous. SAPROLITE		595–592
18–22		CME 4		42/41					SM	SAND silty (SM); pinkish gray (7.5YR 7/2); dry; >10% silt; appreciable rock fragments; PARTIALLY WEATHERED ROCK	Offset to MW-1212A See rock log	591–588
22–40												587–570

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1212A**	
Type and Diameter of Boring NQ2 core / 3 inch	Boring Location Unit 1 CT N 1165371 E 1845450		Total Depth 89.2 feet
Drilling Contractor and Rig TRIGON/Wichard/190742 / CME 850	Elevation and Datum 609.3 feet MSL	Ground Water Depth 32.9 feet	Depth to Bedrock 20.2 feet
Casing Size and Depth 3.5 inch / 20.2 feet	Length of Core Barrel and Bit 8.1 feet	No. of Core Boxes 5	Date Started 3/20/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 3/21/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
21–25	1	3.6/5.0	6	MW	R3		Drilled without sampling to 20.2 ft. See MW-1212 META-GRANODIORITE; greenish gray (5GY 6/1) to light gray (N 7); fine grained; biotite rich; massive Silicified zone from 21 to 22.9 ft No recovery from 23.3 to 24.2 ft Developed gneissic texture from 24.2 to 25.2 ft	Begin NQ core	589–585
25–30	2	0.7/5.0	0	CW			META-GRANODIORITE, silty, fine sand, rock highly weathered. PARTIALLY WEATHERED ROCK.		584–580
30–35	3	4.5/5.0	18	MW	R3		META-GRANODIORITE; light greenish gray (10GY 7/1); fine grained; foliated; vugs 2 to 5 mm in width; biotite rich quartz plagioclase Vugs increase in size, stained with manganese oxide from 33.2 to 35 ft	Losing water (100 gallons per 5 ft.)	579–575
35–40	4	4.9/5.0	54	CW HW SW to F	R0 R0 to R1 R4		SAA; light greenish gray (10GY 7/1); highly weathered zone; fine grained. PARTIALLY WEATHERED ROCK.		574–570
40–45	5	5.0/5.0	84	SW to F	R4			Losing more water (200 gallons per 5 ft.)	569–564
45–50	6	5.0/5.0	56	SW to F	R4				563–560
50–55	7	4.9/5.0	88	SW to F	R4		META-GRANODIORITE; bluish gray (5PB 6/1). CONTINUOUS ROCK.		559–555
55–60	8	5.0/5.0	90	SW to F	R4			Losing water (200 gallons per 3 ft.)	554–550

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1212A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	5.0/5.0	82	SW to F	R4			
10	4.0/4.0	66	SW	R3		META-GRANODIORITE; bluish gray (5PB 6/1); fine grained; slightly foliated; biotite speckled; manganese oxide stained vugs	Losing water (100 gallons per 1 ft.)
						QUARTZITE; light gray (5Y 7/1)	End drilling 3/20/06
11	5.0/5.0	84	SW	R3 to R4		META-GRANODIORITE; bluish gray (5PB 6/1)	Begin drilling 3/21/06; water level at 31 ft
12	5.0/5.0	64	SW	R3 to R4			
13	5.0/5.0	94	SW	R4		SAA; fine; foliated vugs with manganese oxide staining.	
14	4.9/5.0	100	SW to F	R4		SAA; bluish gray (5PB 6/1) to bluish black (10B 2.5/1); fine grained; foliated; quartz veins; manganese oxide stained vugs	
						Total Depth 89.2 ft. Groundwater encountered at 32.9 feet Borehole Grouted On 3/22/06	End drilling 3/21/06; coring terminated On 3/22/06; water at 32.9 ft

Depth (feet): 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

Elevation (feet): 549, 548, 547, 546, 545, 544, 543, 542, 541, 540, 539, 538, 537, 536, 535, 534, 533, 532, 531, 530, 529, 528, 527, 526, 525, 524, 523, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1213**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location Switchyard N 1164716 E 1847770		Total Depth 78.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 578.5 feet MSL	Ground Water Depth 10.1 feet	Depth to Bedrock 52.6 feet
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 6	Date Started 4/4/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/10/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3									GP	GRAVEL, silty, sandy (GP); 0.3 ft of topsoil. FILL	Observed auger cuttings to classify above top of first CME sample.	578–575
									ML	SILT, sandy (ML); red (2.5YR 3/6); dry. FILL		
4–8		CME 1		60/60					SM	SAND, silty (SM); brown (7.5YR 4/3); dry; 30% silt; trace gravel; rock fragments. FILL		574–571
9–13		CME 2		60/60								570–566
14–17		CME 3		60/60								565–562
18–23		CME 4		39.6/60					ML	SILT, (ML); yellowish red (5YR 4/6); moist to wet; no to low plasticity. RESIDUUM	Water on sampler	561–558
24–28		CME 5		34.8/60								557–551
29–31		CME 6		28.8/60								550–547
32–33									SM	SAND, silty (SM); pale brown (10YR 6/3); damp to moist; <10% silt; dark rock fabric like veins. PARTIALLY WEATHERED ROCK	Auger refusal at 34 ft, see rock log	546
34		CME 7		0/6								545
35–40												544–539

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1213**	
Type and Diameter of Boring CME Sampler / 8 inch/NQ	Boring Location Switchyard N 1164716 E 1847770		Total Depth 78.3 feet
Drilling Contractor and Rig MACTEC/Christian/211797 / CME 75	Elevation and Datum 578.5 feet MSL	Ground Water Depth 10.1 feet	Depth to Bedrock 52.6 feet
Casing Size and Depth 2 inch / 34 feet	Length of Core Barrel and Bit 13.1 feet	No. of Core Boxes 4	Date Started 4/4/06
	Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/10/06

Reviewed by / Date F. Syms 5/29/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
34–38		1	2.9/4.3	0	RS	R0		SAND silty (SM); pale brown (10YR 6/3); wet; <10% silt. PARTIALLY WEATHERED ROCK		544–538
39–43		2	0.3/5.0	0	RS	R0			End drilling on 4/4/06 Begin drilling 4/5/06; water level at 18.4 ft	540–536
44–48		3	0.0/5.0	0	RS	R0				535–531
49–53		4	1.6/5.0	0	RS	R0				530–526
53					HW	R3		META-GRANODIORITE; bluish gray (10B 6/1); fine to medium grained; manganese staining on the fracture faces		526
54–57		5	1.1/4.0	0	HW	R3				525–522
58		6	0.9/1.0	0	HW	R3				521
59–63		7	5.0/5.0	30	HW to MW	R3		SAA; several schist xenoliths; chlorite, K-spar, plagioclase, biotite, iron staining on surfaces		520–516
64–65		8	2.5/2.5	60	MW	R3		SAA; bluish gray; fine to medium grained; chlorite staining vugs <1 mm, quartz xenoliths from 63.3 to 65.8 ft		515–513
66–68		9	2.4/2.5	72	MW	R3		Vugs on the side of the core show pyrite mineralization	End day 4/5/06 Begin day 4/10/06; water level at 10.1 ft	512–511
69–73		10	4.9/5.0	98	SW to F	R3 to R4		SAA; epidote initially along healed fractures Mafic zone 68.7 to 69.2 ft; fine grained; calcite healed fractures; biotite rich speckling with pyrite xenoliths increased in size and frequency		510–506
74										505

Project Name and Job Number
Lee Nuclear Station COL
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MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1213

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
74–78		11	4.8/5.0	96	F	R3 to R4		META-GRANODIORITE; dark bluish gray (10B 4/1); fine grained; calcite, epidote and altered plagioclase filling most fractures.	Coring terminated at 78.3 ft on 4/10/06	504–501
78–114								Total Depth 78.3 ft. Groundwater encountered at 10.1 feet Borehole Grouted On 4/10/06		500–465

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1214**	
Type and Diameter of Boring CME Sampler / 7 inch	Boring Location Switchyard N 1164174 E 1847143		Total Depth 15 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 604.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 3	Date Started 3/17/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/17/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–3										Augered to 3.5 ft wihout sampling.	Auger drilled to 3.5 ft to begin CME sampler	604–601
4–8		CME 1		60/60					ML	SILT clayey (ML); light yellowish brown (10YR 6/4) damp; <15% clay; very micaceous. SAPROLITE SAA; dark yellowish brown (10YR 4/4).		601–596
9–13		CME 2		60/60						SILT sandy (ML); yellowish brown (10YR 5/6 to 10YR 5/4); damp; soft; <15 to 20% fine sand; <10% clay some manganese oxide veinlets. SAPROLITE		596–591
14		CME 3		18/18						SAA; yellowish brown (10YR 5/4). SAPROLITE		591–590
15									GM	GRAVEL (GM); yellowish brown (10YR 5/6); damp; <15% fines; PARTIALLY WEATHERED ROCK	Auger refusal 15 ft; moved 5 ft from this hole and extended casing to 16 ft, begin rock coring, see soil log and rock log MW-1214A	590–587
16–40												586–565

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**ROCK LOG - Boring No. MW-1214A**	
Type and Diameter of Boring NQ core / 8 inch/NQ	Boring Location Switchyard N 1164175 E 1847147		Total Depth 96 feet
Drilling Contractor and Rig MACTEC/White/331145 / CME 55 LC	Elevation and Datum 604.5 feet MSL	Ground Water Depth 14 feet	Depth to Bedrock 16 feet
Casing Size and Depth 3 inch / 18 feet	Length of Core Barrel and Bit 8.1 feet	No. of Core Boxes 4	Date Started 3/17/06
	Borehole Inclination -90	Logged by E. Weldon	Date Completed 3/19/06

Reviewed by / Date F. Syms 5/23/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
16–21		1	2.5/5.0	0	HW to MW	R0 to R3		META-QUARTZ DIORITE; light brownish gray (2.5Y 6/2); porphyroblastic; fine to coarse grained; foliation 45 to 50°. Fractures mainly parallel foliation or break subvertically; minor minerals mica and pyrite; fine grained pyroxene or amphibole; plagioclase and quartz		588–584
21–26		2	3.0/5.0	22	HW to MW	R1				583–579
26–31		3	3.3/5.0	7	HW MW	R1 R1		SAA; dark grayish brown (10YR 4/2) SAA; (2.5Y 8/1); rock slightly stronger SAA; but heavily fractured; less biotite than above		578–574
31–36		4	2.2/5.0	0	HW	R0		META-GRANODIORITE; color change to dark grayish brown; medium to coarse grained; equigranular; crystals aligned parallel to foliation at 30°. PARTIALLY WEATHERED ROCK.		573–569
36–41		5	2.6/5.0	8	HW	R0				568–564
41–46		6	3.4/5.0	9	MW	R1 R2		SAA; very pale brown (10YR 7/3); foliation at 30°; abundant incipient fractures. SAA; medium to coarse grained; porphyroblastic texture; very fine grained minerals, feldspar, quartz	Begin drilling 3/19/04; water at 14 ft; losing some water	563–559
46–51		7	5.0/5.0	26	SW	R3		META-GRANODIORITE; with biotite; gray (2.5Y 6/1); fine to coarse grained biotite; quartz, feldspar (plagioclase), other mafics; healed fractures throughout; veins filled with pyrite; minor calcite. PARTIALLY WEATHERED ROCK.		558–554
51–56		8	5.0/5.0	40	SW	R3		SAA; grayish brown (2.5Y 5/2).		553–549

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1214A

Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks
9	5.0/5.0	34	SW	R3		SAA; grey (5Y 5/1); fine to medium grained; pervasive healed shears; very closed spaced fractures irregular and planar parallel to foliation. Joint surfaces display mica aligned parallel to foliation. Vugs and pits in fractures	
10	2.2/5.0	0	SW	R3		META-GRANODIORITE; medium to coarse grained; migmitized/cataclasized textured; abundant iron oxide stains on fracture surfaces	Still losing some water
11	2.1/5.0	0	SW	R3		SAA; dark gray (2.5Y 4/1); becoming fine grained near 70 ft.	
12	5.0/5.0	80	F	R4		SAA; fine grained. Thin healed shears common, often parallel, some calcite filled; calcite veins (<5 mm) planar to irregular and discontinuous	Losing all water
13	4.7/5.0	70	F	R4		SAA; gray (2.5Y 6/1).	
			HW to MW	R1		META-GRANODIORITE; gray (5Y 5/1); vugs and pits along foliation and fracture/shear lines; some fractures surfaces stained black. PARTIALLY WEATHERED ROCK.	
14	2.8/5.0	0	HW to MW	R1			Still losing all water
			SW	R3		META-GRANODIORITE biotite rich; gray with foliated sheared (mylonitized); fabric ~40 to 60°. CONTINUOUS ROCK.	
15	4.8/5.0	84	SW	R3		SAA; gray; fine to medium grained throughout core; crystals xenoblastic; very closely spaced irregular fractures; minor calcite veins thin (1 mm); quartz vein (1 cm)	
			SW to F	R4			
16	4.8/5.0	90	F	R3 to R4			

Depth (feet): 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96

Elevation (feet): 548, 547, 546, 545, 544, 543, 542, 541, 540, 539, 538, 537, 536, 535, 534, 533, 532, 531, 530, 529, 528, 527, 526, 525, 524, 523, 522, 521, 520, 519, 518, 517, 516, 515, 514, 513, 512, 511, 510, 509

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

ROCK LOG - Boring No. MW-1214A

Depth (feet)	Lithology	Run No.	Recovery / Cut	% RQD	Weathering	Strength	In-Situ Testing	Lithology	Remarks	Elevation (feet)
96									Coring terminated at 96 ft	508
97										507
98										506
99								Total Depth 96 ft.		505
100								Groundwater encountered at 14 feet Borehole Grouted On 3/28/06		504
101										503
102										502
103										501
104										500
105										499
106										498
107										497
108										496
109										495
110										494
111										493
112										492
113										491
114										490
115										489
116										488
117										487
118										486
119										485
120										484
121										483
122										482
123										481
124										480
125										479
126										478
127										477
128										476
129										475
130										474
131										473
132										472
133										471
134										470
135										469
136										

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1215**	
Type and Diameter of Boring No samples / 12 inch/8 inch	Boring Location General site N 1166710.545 E 1846624.819		Total Depth 101.5 feet
Drilling Contractor and Rig Geologic / D120 / Air	Elevation and Datum 589.69 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock N/A
Sampling Method No sampling	Sample Driving Hammer/Drop NA / NA	No. of Samples 0	Date Started 4/17/06
	Borehole Inclination -90	Logged by J. Jordan	Date Completed 4/17/06

Reviewed by / Date J. Jordan 4/14/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0											Drilled with 12 inch hollow stem augers Refusal at 69 ft. Switched to air drill	589
1												588
2												587
3												586
4												585
5												584
6												583
7												582
8												581
9												580
10												579
11												578
12												577
13												576
14												575
15												574
16												573
17												572
18												571
19												570
20												569
21												568
22												567
23												566
24												565
25												564
26												563
27												562
28												561
29												560
30												559
31												558
32												557
33												556
34												555
35												554
36												553
37												552
38												551
39												550
40												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1215

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
40												549
41											Drilled with 12 inch hollow stem augers	548
42											Refusal at 69 ft. Switched to air drill	547
43												546
44												545
45												544
46												543
47												542
48												541
49												540
50												539
51												538
52												537
53												536
54												535
55												534
56												533
57												532
58												531
59												530
60												529
61												528
62												527
63												526
64												525
65												524
66												523
67												522
68												521
69											Air rotary drilling, easy drilling	520
70												519
71												518
72												517
73												516
74												515
75												514
76												513
77												512
78												511
79												510
80												

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

SOIL LOG - Boring No. MW-1215

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
80											Air rotary drilling, harder drilling Removed drill rods, hole caved, removed cave-in to 88 ft with 12 inch hollow stem augers, then used 8 inch mud rotary drilling (with water) to remove additional cuttings to 101.5 ft. Boring terminated at 101.5 ft, installed well	509
81												508
82												507
83												506
84												505
85												504
86												503
87												502
88												501
89												500
90												499
91												498
92												497
93												496
94												495
95												494
96												493
97												492
98												491
99												490
100												489
101												488
102												487
103												486
104										Total Depth 101.5 ft.		485
105												484
106												483
107												482
108												481
109												480
110												479
111												478
112												477
113												476
114												475
115												474
116												473
117												472
118												471
119												470
120												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1216**	
Type and Diameter of Boring Geoprobe / 2 1/4 inch	Boring Location South of Power Block N 1165171.882 E 1846927.273		Total Depth 28.0 feet
Drilling Contractor and Rig Geologic / Geoprobe	Elevation and Datum 588.009 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 7	Date Started 7/19/06
	Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/19/06

Reviewed by / Date B. Reinicker 8/1/06

Reviewed by / Date CES 11/4/2009

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–4		CME 1		42/48					ML	SILT sandy, gravelly (ML); light yellow to tan (2.5Y 8/2); dry; no plasticity; becoming stiff at 2.5 ft. FILL	Using geoprobe sampler for continuous sampling Continuous samples were taken using Geoprobe system, which results in a sample similar to a CME Sampler	588–584
4–8		CME 2		40/48					ML	SILT (ML); reddish brown (2.5YR 5/8); no plasticity; RESIDUUM		583–580
8–11		CME 3		44/48						SILT with some gravel seams; tan (7.5YR 7/4)		579–577
11–12									SM	SAND silty (SM); yellow brown (2.5Y 7/4); dry		577–576
12–13									ML	SILT (ML); reddish brown; no plasticity		576–575
13–16		CME 4		44/48					SM	SAND silty (SM); yellow brown (2.5Y 7/4); dry; fine grained; SAPROLITE		575–572
16–20		CME 5		44/48						SAA; becoming moist at 18 ft	Becoming moist	572–568
20–24		CME 6		44/48					SM	SAND silty (SM); light gray (10R 7/1); moist SAA; brown; moist to wet	Moist to wet	568–564
24–28		CME 7		44/48						SAND silty (SM); brown (10YR 5/6); fine grained; becoming saturated at 25 ft BORING TERMINATED at 28 ft.	Saturated appearance	564–560
28–40										Total Depth 28 ft.	Boring terminated	560–549

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1217**	
Type and Diameter of Boring Geoprobe / 2 1/4 inch	Boring Location South of Power Block N 1165042.463 E 1846983.878		Total Depth 19.8 feet
Drilling Contractor and Rig Geologic / Geoprobe	Elevation and Datum 587.635 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 5	Date Started 7/19/06
	Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/19/06

Reviewed by / Date B. Reinicker 8/1/06

Reviewed by / Date CES 11/4/2009

Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
	CME 1		46/48					ML	SILT gravelly (ML); gray (10Y 8/1); dry; no plasticity; FILL	Using geoprobe sampler for continuous sampling
								ML	SILT sandy, some gravel (ML); red brown (2.5YR 5/6); dry; no plasticity; FILL	Continuous samples were taken using Geoprobe system, which results in a sample similar to a CME Sampler
	CME 2		46/48					GW-GM	GRAVEL silty (GW-GM); dry	
								ML	SILT sandy (ML); (2.5YR 5/6); dry; no plasticity; FILL	
	CME 3		46/48					GW-GM	GRAVEL silty (GW-GM); gray; dry	
								ML	SAND silty (ML); FILL	
	CME 4		46/48					GW-GM	GRAVEL; dry (FILL)	
								CL	CLAY silty (CL); brown (7.5YR 5/2); moist to wet; RESIDUUM	
	CME 5		45.8/45.6					SW	SAND (SW); gray brown; wet to saturated; SAPROLITE	
									Total Depth 19.8 ft.	Geoprobe refusal. Boring terminated

Depth (feet): 0–40. Elevation (feet): 587–548.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. MW-1218**	
Type and Diameter of Boring Geoprobe / 2 1/4 inch	Boring Location South of Power Block N 1164859.672 E 1847139.635		Total Depth 16.0 feet
Drilling Contractor and Rig Geologic / Geoprobe	Elevation and Datum 588.121 feet MSL	Ground Water Depth Not Observed	Depth to Bedrock N/A
Sampling Method Continuous Sampler	Sample Driving Hammer/Drop NA / NA	No. of Samples 4	Date Started 7/19/06
	Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/19/06

Reviewed by / Date B. Reinicker 8/1/06

Reviewed by / Date CES 11/4/2009

Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks
									GRAVEL (GP)	Using geoprobe sampler for continuous sampling
	CME 1		46/48					ML	SILT gravelly (ML); tan and light brown (10YR 8/4); dry; no plasticity	
								GM	GRAVEL (GM); predominantly quartz angular grains	Continuous samples were taken using Geoprobe system, which results in a sample similar to a CME Sampler
								ML	SILT gravelly (ML); (10YR 7/4)	
	CME 2		45/48					GM	GRAVEL (GM); predominantly quartz angular grains	
								ML	SILT sandy (ML); tan (10YR 7/6); no plasticity	
								SM	SAND silty (SM) with gravel seam from 8.5 to 8.75 ft; dry; no plasticity; becoming moist at 10.5 ft	Becomes very dense
	CME 3		45/48							Becomes moist
								GM	GRAVEL (GM)	
	CME 4		43/48					SM	SAND silty (SM) (10YR 7/4)	Becomes wet
								SM	SAND silty (SM); (10YR 6/8) SAPROLITE	
									BORING TERMINATED at 16 ft	Boring terminated

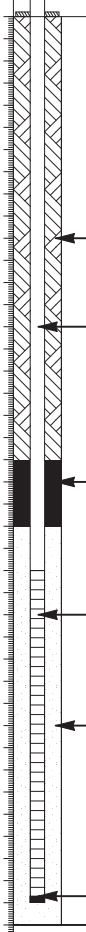
Total Depth 16 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1200 (well)**
Type and Diameter of Boring Air Rotary / 6 inch		Boring Location General site N 1166348.442 E 1845571.069			Total Depth 41.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D25KW		Elevation and Datum 591.9 feet MSL	Ground Water Depth N/A		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 40 feet	Top of Casing Elevation 594 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/10/06
		Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/10/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)



Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1200 and MW-1200A for lithology)

SURFACE SEAL - 0.3 to 20 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 20 to 23 ft. - Bentonite Pellets.

SCREEN - 25 to 40 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 23 to 41 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 41 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1201 (well)**
Type and Diameter of Boring Air Rotary / 10 inch / 6 inch		Boring Location General site N 1166689.304 E 1846578.824			Total Depth 102.5 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 589.9 feet MSL	Ground Water Depth 40 feet		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 101.5 feet	Top of Casing Elevation 592.1 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/19/06
		Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/19/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1201 for lithology)

SURFACE SEAL - 0.3 to 82.5 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1201 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

BLANK CASING - 2 inch diameter PVC casing installed threaded joints (Sch40)

SEAL - 82.5 to 84.5 ft - Bentonite Pellets

SCREEN - 86.5 to 101.5 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 84.5 to 102.5 ft - Silica Sand size No. 2

CAP - Threaded cap

Total Depth 102.5 ft.
Groundwater encountered at 40 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389				**WELL CONSTRUCTION LOG - MW-1201A (well)**
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location General site N 1166693.529 E 1846576.539		Total Depth 48 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 590.1 feet MSL	Ground Water Depth 37 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 47 feet	Top of Casing Elevation 592.1 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/18/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/18/06

Reviewed by / Date J. Laughlin 7/18/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1201 for lithology)

SURFACE SEAL - 0.5 to 34 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing with threaded joints (Sch40)

SEAL - 34 to 36 ft - Bentonite Pellets

SCREEN - 37 to 47 ft. - 2 inch diameter PVC well screen with 0.010 inch slot size

FILTER PACK - 36 to 48 ft. - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 48 ft.
Groundwater encountered at 37 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389						
MACTEC / WLA William Lettis & Associates, Inc.			**WELL CONSTRUCTION LOG - MW-1202 (well)**			
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch			Boring Location General site N 1167018.978 E 1847472.03		Total Depth 78.5 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D25KW/D50			Elevation and Datum 587.5 feet MSL	Ground Water Depth 26 feet	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 77.5 feet	Top of Casing Elevation 589.7 feet		Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/14/06	
			Borehole Inclination -90	Logged by J. Jordan	Date Completed 4/14/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Elevation (feet)

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1202 for lithology)

SURFACE SEAL - 0.3 to 55 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 55 to 58 ft - Bentonite Pellets

SCREEN - 62.5 to 77.2 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1202 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

FILTER PACK - 58 to 78.5 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 78.5 ft.
Groundwater encountered at 26 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1203 (well)**
Type and Diameter of Boring Air Rotary / 6 inch		Boring Location Cooling Tower Unit 2 N 1166702.12 E 1847838.422			Total Depth 77.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D25KW		Elevation and Datum 589.5 feet MSL	Ground Water Depth N/A		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 75 feet	Top of Casing Elevation 591.9 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/11/06
		Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/11/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Elevation (feet)

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1203 for lithology)

2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 55 to 58 ft - Bentonite Pellets

SCREEN - 60 to 75 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1203 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

FILTER PACK - 58 to 77 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 77 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1204 (well)**
Type and Diameter of Boring Hollow stem / Air Rotary / 6 inch		Boring Location Cooling Tower Unit 2 N 1166141.154 E 1848033.4			Total Depth 115.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 609.9 feet MSL	Ground Water Depth 38 feet		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 114 feet	Top of Casing Elevation 612.4 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/14/06
		Borehole Inclination -90	Logged by J. Cerceo		Date Completed 4/14/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

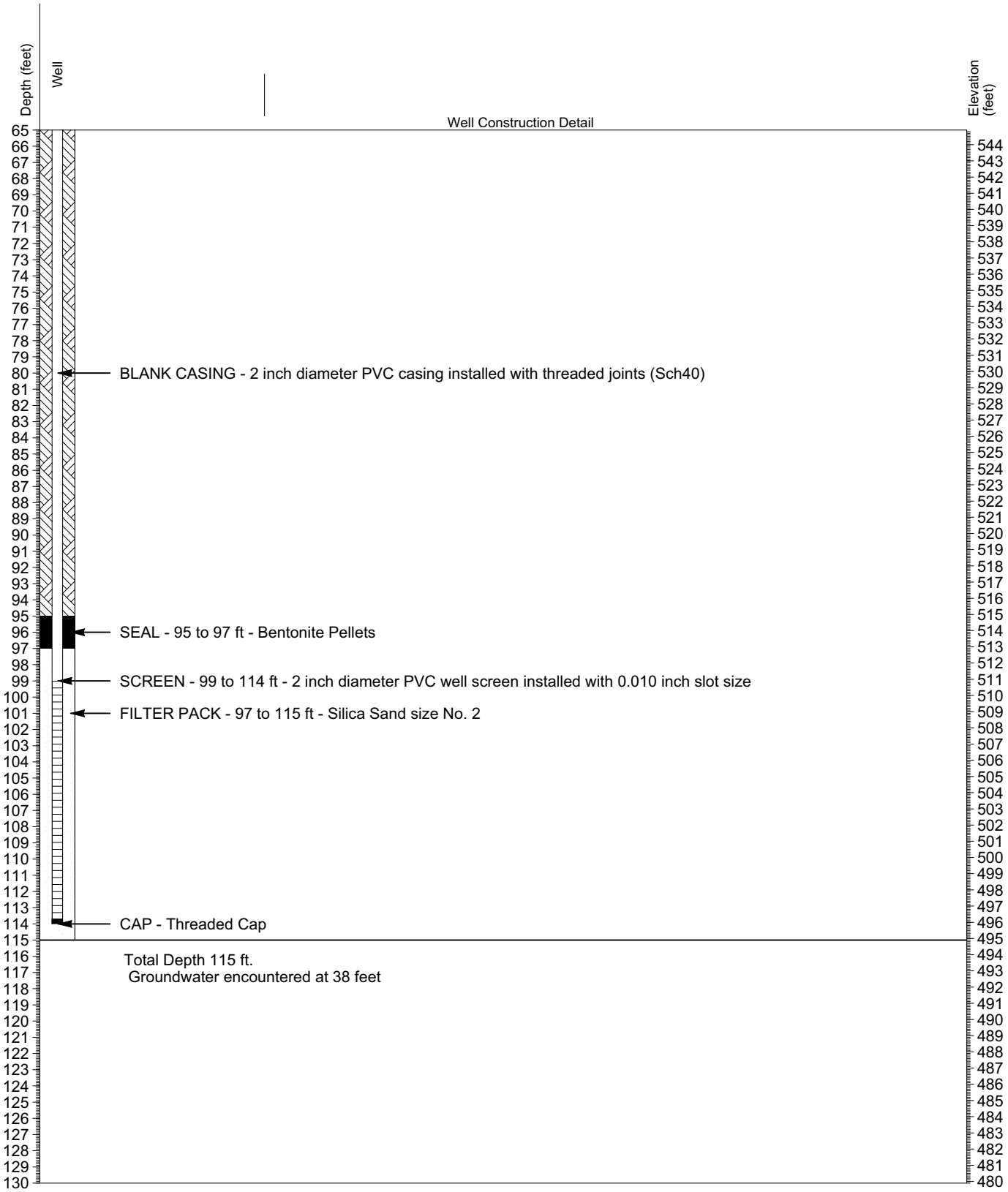
Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW 1204 for lithology)

SURFACE SEAL - 0.3 to 95 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1204 (well)



Project Name and Job Number Lee Nuclear Station COL 6234-06-3389				**WELL CONSTRUCTION LOG - MW-1204A (well)**
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location Cooling Tower Pad N 1166133.724 E 1848034.258		Total Depth 50 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 609.9 feet MSL	Ground Water Depth 33.5 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 49 feet	Top of Casing Elevation 612.4 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/17/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/17/06

Reviewed by / Date J. Laughlin 7/17/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1204 for lithology)

SURFACE SEAL - 0.5 to 35 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 35 to 37 ft - Bentonite Pellets

SCREEN - 39 to 49 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 37 to 50 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 50 ft.
Groundwater encountered at 33.5 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1205 (well)**
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch		Boring Location General site N 1165631.431 E 1848304.849		Total Depth 124.0 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 610 feet MSL	Ground Water Depth 50 feet	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 123 feet	Top of Casing Elevation 612.6 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/15/06	
		Borehole Inclination -90	Logged by J. Cerceo	Date Completed 4/15/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1205 for lithology)

SURFACE SEAL - 0.3 to 104 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1205 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 104 to 106 ft - Bentonite Pellets

SCREEN - 108 to 123 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 106 to 124 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 124 ft.
Groundwater encountered at 50 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389							
MACTEC / WLA William Lettis & Associates, Inc.			**WELL CONSTRUCTION LOG - MW-1206 (well)**				
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch			Boring Location General site N 1166655.908 E 1846689.086			Total Depth 68.5 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW			Elevation and Datum 589.7 feet MSL	Ground Water Depth 58 feet		Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 67.5 feet	Top of Casing Elevation 591.5 feet		Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/18/06	
			Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/18/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1206 for lithology)

SURFACE SEAL - 0.3 to 47.5 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 47.5 to 50 ft - Bentonite Pellets

SCREEN - 52.5 to 67.5 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 50 to 68.5 ft - Silica sand size No. 2

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1206 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

CAP - Threaded Cap

Total Depth 68.5 ft.
Groundwater encountered at 58 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1206A (well)**
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location General site N 1166656.288 E 1846693.299		Total Depth 43 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 589.8 feet MSL	Ground Water Depth 35.3 feet	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 42 feet	Top of Casing Elevation 591.4 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/17/06	
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/17/06	

Reviewed by / Date J. Laughlin 7/17/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1206 for lithology)

SURFACE SEAL - 0.5 to 29 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 29 to 31 ft - Bentonite Pellets

SCREEN - 32 to 42 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 31 to 43 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 43 ft.
Groundwater encountered at 35.3 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1207 (well)**
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch		Boring Location General site N 1166849.173 E 1846668.764		Total Depth 108.0 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 589 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 107.3 feet	Top of Casing Elevation 591.4 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/24/06	
		Borehole Inclination -90	Logged by B. Reinicker	Date Completed 4/24/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Elevation (feet)

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1207 for lithology)

SURFACE SEAL - 0.3 to 88 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1207 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 88 to 90 ft - Bentonite Pellets

SCREEN - 92 to 107 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 90 to 108 ft - Silica sand size No. 2

CAP - Threaded Cap

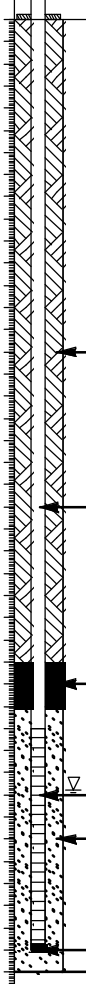
Total Depth 108 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1207A (well)**
Type and Diameter of Boring Hollow stem / 8.25 inch		Boring Location General site N 1166846.232 E 1846673.41			Total Depth 43 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 588.9 feet MSL	Ground Water Depth 34.77 feet		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 42 feet	Top of Casing Elevation 591 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 7/18/06
		Borehole Inclination -90	Logged by J. Laughlin		Date Completed 7/18/06

Reviewed by / Date J. Laughlin 7/18/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)



Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1207 for lithology)

SURFACE SEAL - 0.5 to 29 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 29 to 31 ft - Bentonite Pellets

SCREEN - 32 to 42 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 31 to 43 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 43 ft.
Groundwater encountered at 34.77 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389						
MACTEC / WLA William Lettis & Associates, Inc.			**WELL CONSTRUCTION LOG - MW-1208 (well)**			
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch			Boring Location General site N 1167188.532 E 1846583.513		Total Depth 79.0 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW			Elevation and Datum 587.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 76.5 feet	Top of Casing Elevation 590 feet		Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/13/06	
			Borehole Inclination -90	Logged by J. Jordan	Date Completed 4/13/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1208 for lithology)

SURFACE SEAL - 0.3 to 56 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 56 to 59 ft - Bentonite Pellets

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1208 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

SCREEN - 61.5 to 76.5 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 59 to 79 ft - Silica Sand size No. 2

CAP- Threaded Cap

Total Depth 79 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1209 (well)**
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch		Boring Location General site N 1165084.761 E 1848071.547		Total Depth 106.0 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 586.9 feet MSL	Ground Water Depth 37 feet	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 104 feet	Top of Casing Elevation 588.9 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/18/06	
		Borehole Inclination -90	Logged by J. Jordan	Date Completed 4/18/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1209 for lithology)

SURFACE SEAL - 0.3 to 84.6 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1209 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

Bentonite Seal (Pellets) installed from 84.6 to 87 ft

SCREEN - 89 to 104 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 87 to 106 ft - Silica sand size No. 2

CAP - Threaded Cap

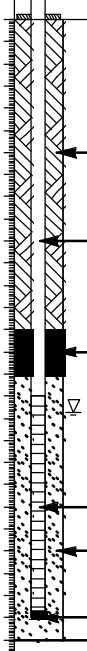
Total Depth 106 ft.
Groundwater encountered at 37 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389				**WELL CONSTRUCTION LOG - MW-1209A (well)**
Type and Diameter of Boring Hollow stem / 8.25 inch		Boring Location General site N 1165076.658 E 1848072.885		Total Depth 28 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 586.9 feet MSL	Ground Water Depth 17.72 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 27 feet	Top of Casing Elevation 589 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/17/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/17/06

Reviewed by / Date J. Laughlin 7/21/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)



Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1209 for lithology)

SURFACE SEAL - 0.5 to 14 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 14 to 16 ft Bentonite Pellets

SCREEN - 17 to 27 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 16 to 28 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 28 ft.
Groundwater encountered at 17.72 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389							
MACTEC / WLA William Lettis & Associates, Inc.		**WELL CONSTRUCTION LOG - MW-1210 (well)**					
Type and Diameter of Boring Hollow stem / Air Rotary / 10 inch / 6 inch			Boring Location Unit 2 adjacent N 1165321.305 E 1847439.208			Total Depth 101.5 feet	
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW			Elevation and Datum 589.8 feet MSL		Ground Water Depth 20 feet	Depth to Bedrock N/A	
Casing Size and Depth 2 inch / 101.5 feet	Top of Casing Elevation 592.3 feet		Length of Core Barrel and Bit N/A		No. of Core Boxes N/A	Date Started 4/15/06	
			Borehole Inclination -90		Logged by J. Cerceo	Date Completed 4/16/06	

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Elevation (feet)

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1210 for lithology)

SURFACE SEAL - 0.3 to 82.5 ft - Cement/Bentonite Grout Mix

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1210 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 82.5 to 84.2 ft - Bentonite Pellets

SCREEN - 86.2 to 101.2 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 84.2 to 101.5 ft - Silica Sand size No. 2

CAP - Threaded Cap

Total Depth 101.5 ft.
Groundwater encountered at 20 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**WELL CONSTRUCTION LOG - MW-1210A (well)**		
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location Unit 2 adjacent N 1165312.832 E 1847436.803		Total Depth 30 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 589.4 feet MSL	Ground Water Depth 20.42 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 29 feet	Top of Casing Elevation 591.7 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/17/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/17/06

Reviewed by / Date J. Laughlin 7/17/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft.
(Refer to geotechnical boring MW-1210 for lithology)

SURFACE SEAL - 0.5 to 16 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 16 to 18 ft - Bentonite Pellets

SCREEN - 19 to 29 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 18 to 30 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 30 ft.
Groundwater encountered at 20.42 feet

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

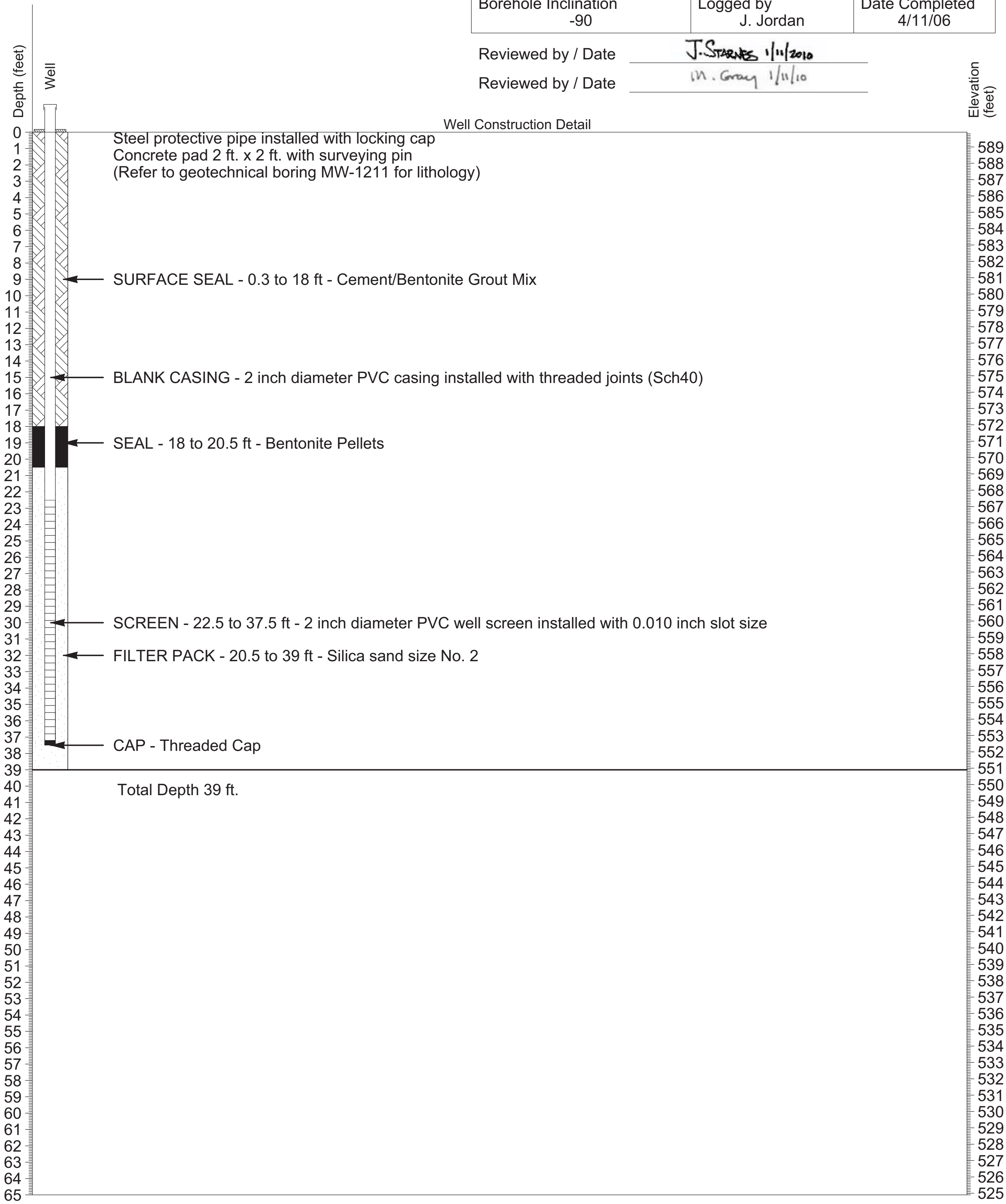
MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1211 (well)

Type and Diameter of Boring: Air Rotary / 6 inch		Boring Location: Unit 1 adjacent N 1165197.583 E 1846406.261		Total Depth: 39.0 feet
Drilling Contractor and Rig: Geologic Exp / Mantak / D25KW		Elevation and Datum: 589.9 feet MSL	Ground Water Depth: N/A	Depth to Bedrock: N/A
Casing Size and Depth: 2 inch / 37.5 feet	Top of Casing Elevation: 591.6 feet	Length of Core Barrel and Bit: N/A	No. of Core Boxes: N/A	Date Started: 4/11/06
		Borehole Inclination: -90	Logged by: J. Jordan	Date Completed: 4/11/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10



Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1212 (well)**
Type and Diameter of Boring Air Rotary / 6 inch		Boring Location Unit 1 CT N 1165365.927 E 1845452.195			Total Depth 47.5 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D25KW		Elevation and Datum 610.2 feet MSL	Ground Water Depth N/A		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 46.5 feet	Top of Casing Elevation 612.3 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/10/06
		Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/10/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft. with surveying pin
(Refer to geotechnical boring MW-1212 for lithology)

SURFACE SEAL -0.3 to 26.5 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 26.5 to 29.5 ft - Bentonite Pellets

SCREEN - 31.5 to 46.5 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 29.5 to 47.5 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 47.5 ft.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389					**WELL CONSTRUCTION LOG - MW-1214 (well)**
Type and Diameter of Boring Air Rotary / 6 inch		Boring Location Switchyard N 1164177.882 E 1847153.83			Total Depth 44.5 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D25KW		Elevation and Datum 605 feet MSL	Ground Water Depth 26 feet		Depth to Bedrock N/A
Casing Size and Depth 2 inch / 43 feet	Top of Casing Elevation 606.5 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A		Date Started 4/11/06
		Borehole Inclination -90	Logged by J. Jordan		Date Completed 4/11/06

Reviewed by / Date J. Starnes 1/11/2010

Reviewed by / Date M. Gray 1/11/10

Depth (feet) | Well | Elevation (feet)

Well Construction Detail

Steel protective pipe installed with locking cap
Concrete pad 2 ft. x 2 ft
(Refer to geotechnical boring MW-1214 and MW-1214A for lithology)

SURFACE SEAL - 0.3 to 23 ft - Cement/Bentonite Grout Mix

BLANK CASING - 2 inch diameter PVC casing installed threaded joints (Sch 40)

SEAL - 23 to 26 ft - Bentonite Pellets

SCREEN - 28 to 43 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 26 to 44.5 ft - Silica sand size No. 2

CAP - Threaded Cap

Total Depth 44.5 ft.
Groundwater encountered at 26 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**WELL CONSTRUCTION LOG - MW-1215 (well)**		
Type and Diameter of Boring No samples / 12 inch/8 inch		Boring Location General site N 1166710.545 E 1846624.819		Total Depth 101.5 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120/D25KW		Elevation and Datum 590.2 feet MSL	Ground Water Depth 40 feet	Depth to Bedrock N/A
Casing Size and Depth 6 inch / 100 feet	Top of Casing Elevation 592.1 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 4/17/06
		Borehole Inclination -90	Logged by J. Jordan	Date Completed 4/17/06

Reviewed by / Date J. Jordan 4/17/06

Reviewed by / Date M. Gray 10-22-07

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

Steel protective pipe installed with locking cap
Concrete pad 3 ft. x 3 ft. with surveying pin

SURFACE SEAL - 0.3 to 35.5 ft - Cement/Bentonite Grout Mix

BLANK CASING - 6 inch diameter PVC casing installed with threaded joints (Sch40)

SEAL - 35.5 to 38 ft - Bentonite Pellets

SCREEN - 40 to 100 ft - 6 inch diameter PVC well screen installed with 0.010 inch slot size

FILTER PACK - 38 to 101.5 ft - Silica sand size No. 2

Project Name and Job Number
Lee Nuclear Station COL
6234-06-3389

MACTEC WLA William Lettis & Associates, Inc.

WELL CONSTRUCTION LOG - MW-1215 (well)

Depth (feet) | Well | Well Construction Detail | Elevation (feet)

CAP - Threaded Cap

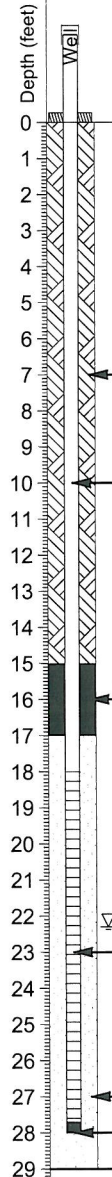
Total Depth 101.5 ft.
Groundwater encountered at 40 feet

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**WELL CONSTRUCTION LOG - MW-1216 (well)**		
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location South of Power Block N 1165171.882 E 1846927.273		Total Depth 29.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 588 feet MSL	Ground Water Depth 22.3 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 28 feet	Top of Casing Elevation 590.7 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/18/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/18/06

Reviewed by / Date [signature] 10/21/2009

Reviewed by / Date MGG 10/21/09

Well Construction Detail

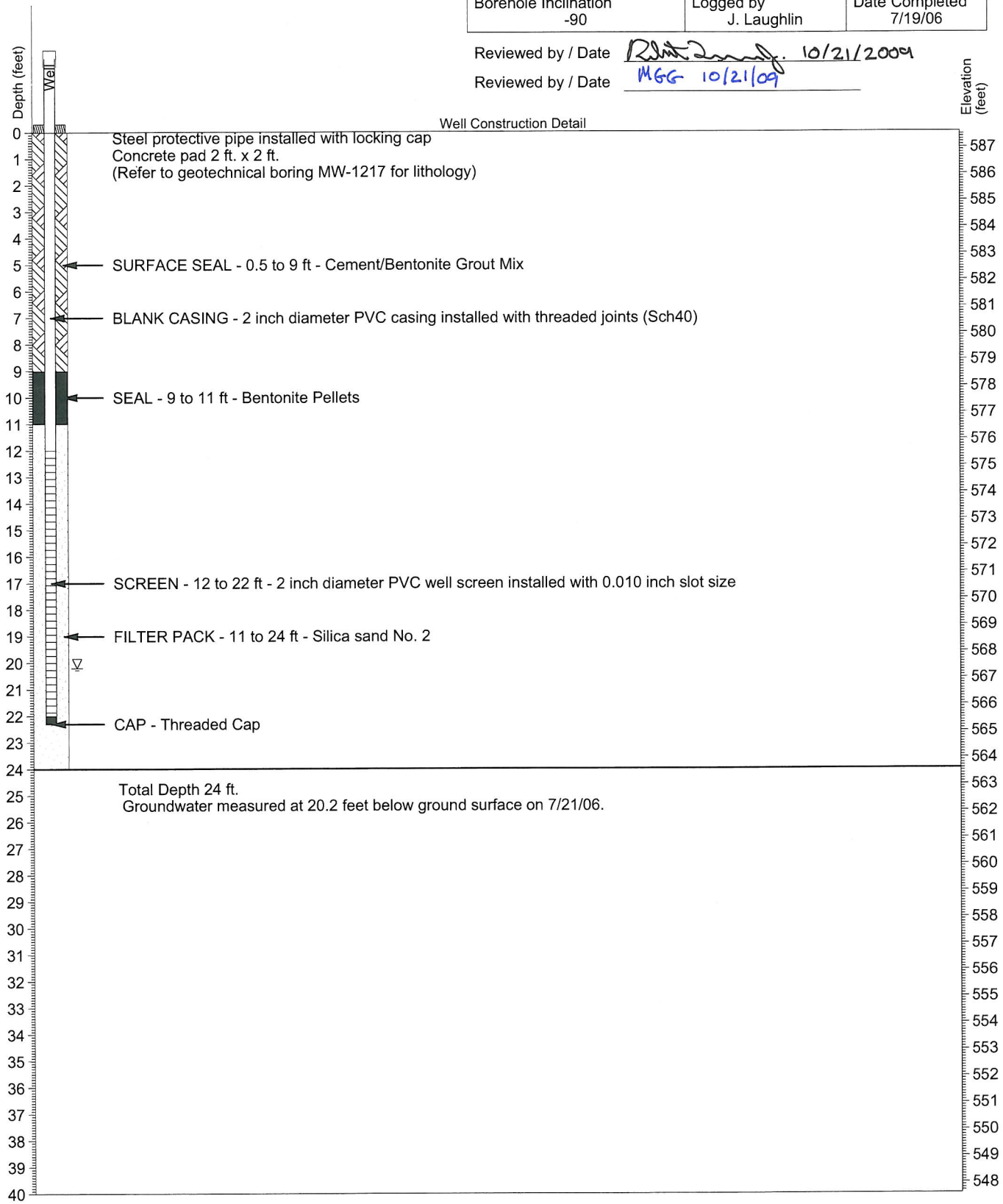


Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**WELL CONSTRUCTION LOG - MW-1217 (well)**		
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location South of Power Block N 1165042.463 E 1846983.878		Total Depth 24.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 587.6 feet MSL	Ground Water Depth 20.2 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 22 feet	Top of Casing Elevation 590.1 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/19/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/19/06

Reviewed by / Date [signature] 10/21/2009

Reviewed by / Date MGG 10/21/09

Well Construction Detail



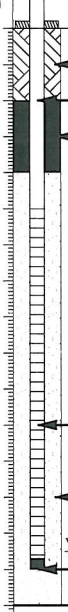
Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**WELL CONSTRUCTION LOG - MW-1218 (well)**		
Type and Diameter of Boring Hollow stem auger / 8.25 inch		Boring Location South of Power Block N 1164859.672 E 1847139.635		Total Depth 16.0 feet
Drilling Contractor and Rig Geologic Exp / Mantak / D120		Elevation and Datum 588.1 feet MSL	Ground Water Depth 14.5 feet	Depth to Bedrock N/A
Casing Size and Depth 2 inch / 15 feet	Top of Casing Elevation 590.2 feet	Length of Core Barrel and Bit N/A	No. of Core Boxes N/A	Date Started 7/18/06
		Borehole Inclination -90	Logged by J. Laughlin	Date Completed 7/18/06

Reviewed by / Date [signature] 10/21/2009

Reviewed by / Date MGG 10/21/09

Depth (feet) | Well | Elevation (feet)

Well Construction Detail



- Steel protective pipe installed with locking cap
- Concrete pad 2 ft. x 2 ft.
- SURFACE SEAL - 0.3 to 2 ft - Cement/Bentonite Grout Mix
- BLANK CASING - 2 inch diameter PVC casing installed with threaded joints (Sch40)
- SEAL - 2 to 4 ft - Bentonite Pellets
- (Refer to geotechnical boring MW-1218 for lithology)
- SCREEN - 5 to 15 ft - 2 inch diameter PVC well screen installed with 0.010 inch slot size
- FILTER PACK - 4 to 16 ft - Silica sand size No. 2
- CAP - Threaded Cap

Total Depth 16 ft.
Groundwater measured at 14.5 feet below ground surface on 7/21/06.

APPENDIX 2AA
ATTACHMENT 2 – LEE NUCLEAR STATION SPT ENERGY MEASUREMENTS

This Attachment contains a table showing results of STP energy measurement testing performed by MACTEC Engineering, Inc. for the Lee Nuclear Station COL investigation. Tests were performed between April 10, 2006 and August 5, 2006, and were performed in compliance with ASTM standard D4633-05.

WLS COL 2.5-1

TABLE B-1: SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)

Lee Nuclear Station COL Project

Gaffney, Cherokee County, South Carolina

MACTEC Project No. 6234-06-3389

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (ft-lbs)[a]	Energy Transfer Ratio (%)[b]
337153 (CME 550x)	MACTEC (Atlanta Office)	Robert Banks	B-1023	4/10/2006	13.5 - 15.0	4 - 9 - 10	23	260	74.3%
					18.5 - 20.0	7 - 11 - 11	28	273	78.0%
					23.5 - 25.0	11 - 11 - 26	48	278	79.4%
					27.0 - 28.5	50 / 2"	39	277	79.1%
						Total Average for Rig:		**273.7**	**78.2%**
211797 (CME 75 Truck)[c]	MACTEC (Abingdon Office)	Wayne Gibson	B-403	8/5/2006	8.5 - 10.0	2 - 3 - 7	10	253	72.3%
					13.5 - 15.0	6 - 7 - 14	23	287	82.0%
					18.5 - 20.0	WOH - 6 - 13	20	262	74.9%
					23.5 - 25.0	3 - 5 - 10	18	262	74.9%
						Total Average for Rig:		**268.8**	**76.8%**
331145 (CME 55LC Truck)[c]	MACTEC (Raleigh Office)	David White	B-304	6/5/2006	11.0 - 12.5	4 - 5 - 7	16	293	83.7%
					13.5 - 15.0	4 - 6 - 8	18	290	82.9%
					18.5 - 20.0	4 - 6 - 7	17	288	82.3%
					23.5 - 25.0	5 - 7 - 10	22	287	82.0%
					28.5 - 30.0	5 - 7 - 7	19	291	83.1%
						Total Average for Rig:		**289.6**	**82.8%**

Prepared By: SL	Date: 12-7-06	Checked By: Clay Sams	Date: 12-7-06

TABLE B-1: SUMMARY OF SPT ENERGY MEASUREMENTS (ASTM D4633-05)

Lee Nuclear Station COL Project

Gaffney, Cherokee County, South Carolina

MACTEC Project No. 6234-06-3389

Rig Serial No.	Rig Owner	Rig Operator	Boring No. Tested	Date Tested	Sample Depth (feet)	SPT Blow Count (blows per six inches)	No. of Blows Analyzed	Average Measured Energy (ft-lbs)[a]	Energy Transfer Ratio (%)[b]
190742 (CME 850 Track)	Trigon (Greensboro Office)	Willie Duggins	B-1030	4/11/2006	13.5 - 15.0	4 - 6 - 7	18	278	79.4%
					18.5 - 20.0	5 - 8 - 9	23	289	82.6%
					23.5 - 25.0	5 - 6 - 9	22	293	83.7%
					28.5 - 30.0	5 - 6 - 6	18	294	84.0%
					33.5 - 35.0	4 - 6 - 8	19	293	83.7%
					38.5 - 40.0	4 - 13 - 11	29	279	79.7%
						Total Average for Rig:		**287.2**	**82.1%**

[a]Measured Energy is energy based on the EFV method, as outlined in ASTM D4633-05, for each blow recorded by the PDA. In some cases, the initial blow produced poor quality data, and was not used to calculate the Average Measured Energy.

[b]Energy Transfer Ratio is the Measured Energy divided by the theoretical SPT energy of 350 foot-pounds (140 pound hammer falling 2.5 feet).

[c]Rig was tested at VC Summer COL site in Jenkinsville, South Carolina (MACTEC Project No. 6234-06-3534S).

Prepared By: SU	Date: 12-7-06	Checked By: Clay Sams	Date: 12-7-06

APPENDIX 2AA
ATTACHMENT 3 – LEE NUCLEAR STATION TEST PIT AND TRENCH LOGS

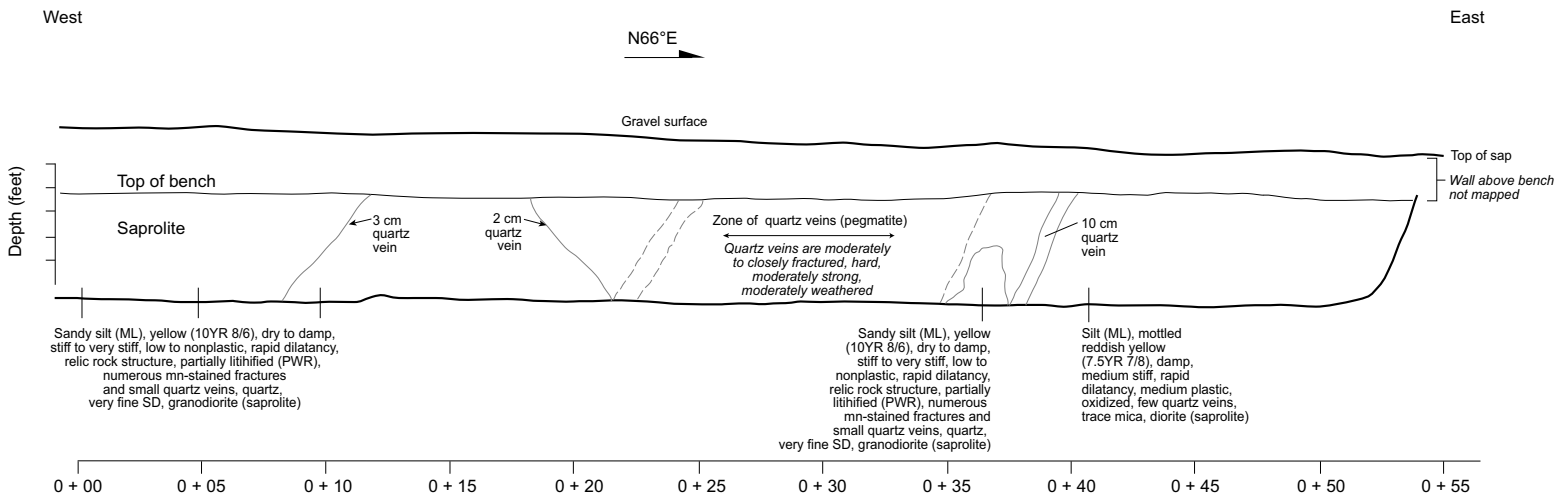
This Attachment contains test pit and trench logs resulting from the COL investigation. A list of the test pits and trenches is included within this attachment.

WLS COL 2.5-1

Test Pits and Trenches Included in Appendix 2AA, Attachment 3

T-1400A
T-1400B
T-1401
T-1402
T-1403
T-1404
T-1419
T-1420
T-1421
T-1422
T-1423
T-1424
T-1425
T-1426

WLS COL 2.5-1



Northing	1165455
Easting	1846182
Elevation (ft MSL)	589

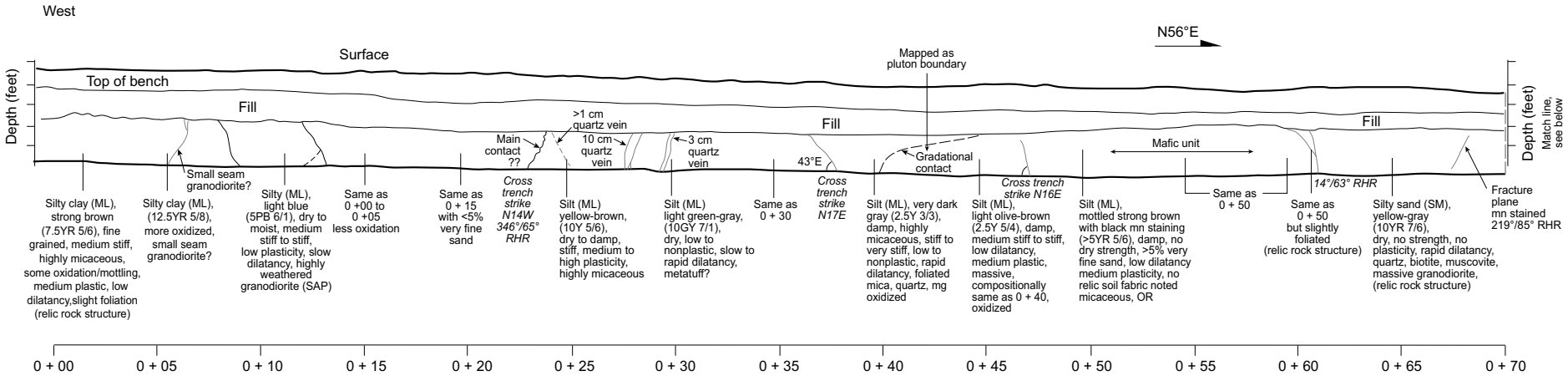
Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

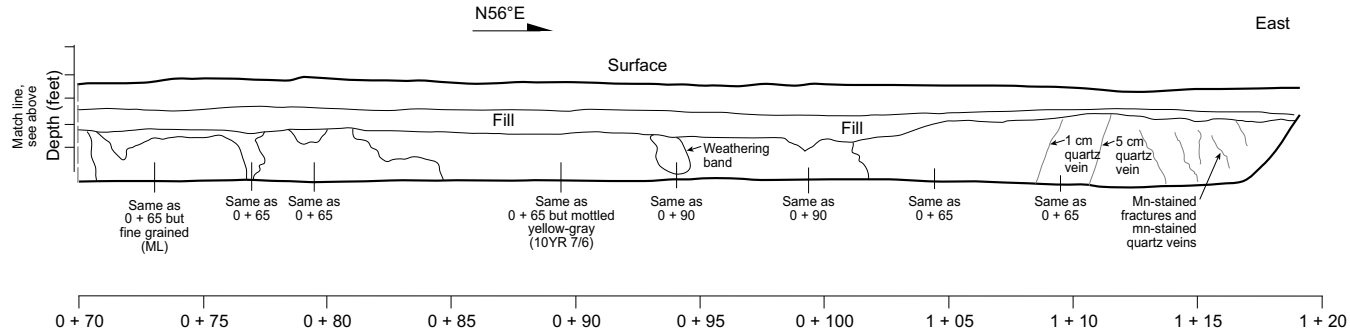
DUKE LEE COL PROJECT

Trench Log – T-1400A

WLA WILLIAM LETTIS & ASSOCIATES, INC.

Revised October 16, 2007





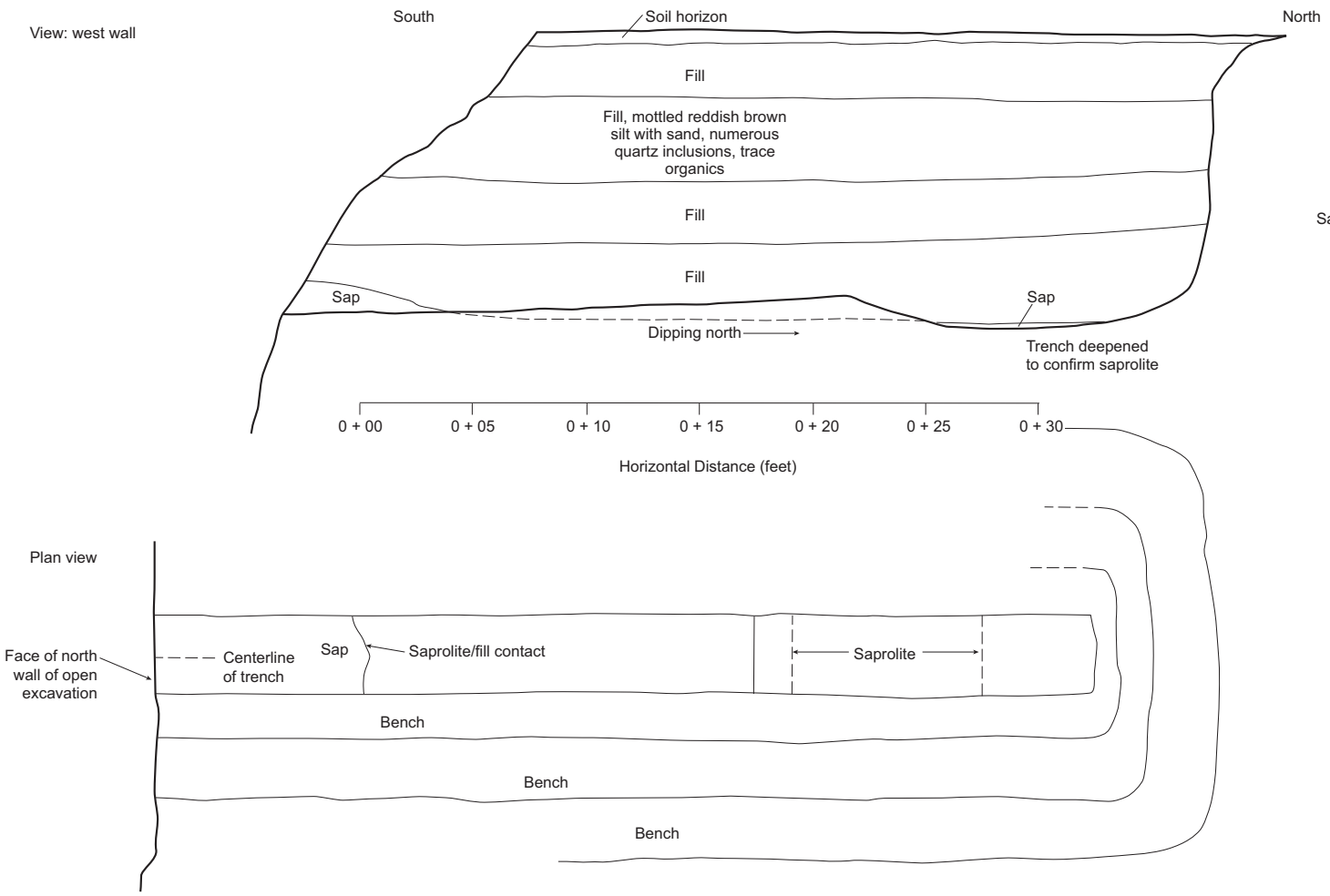
Northing	1165328
Easting	1845956
Elevation (ft MSL)	590

Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

DUKE LEE COL PROJECT

T-1400B

WLA WILLIAM LETTIS & ASSOCIATES, INC.



Unit Descriptions

Sap Saprolite, light greenish gray (10Y 8/1), silt (ML) very stiff, damp, oxidation staining (granite saprolite)

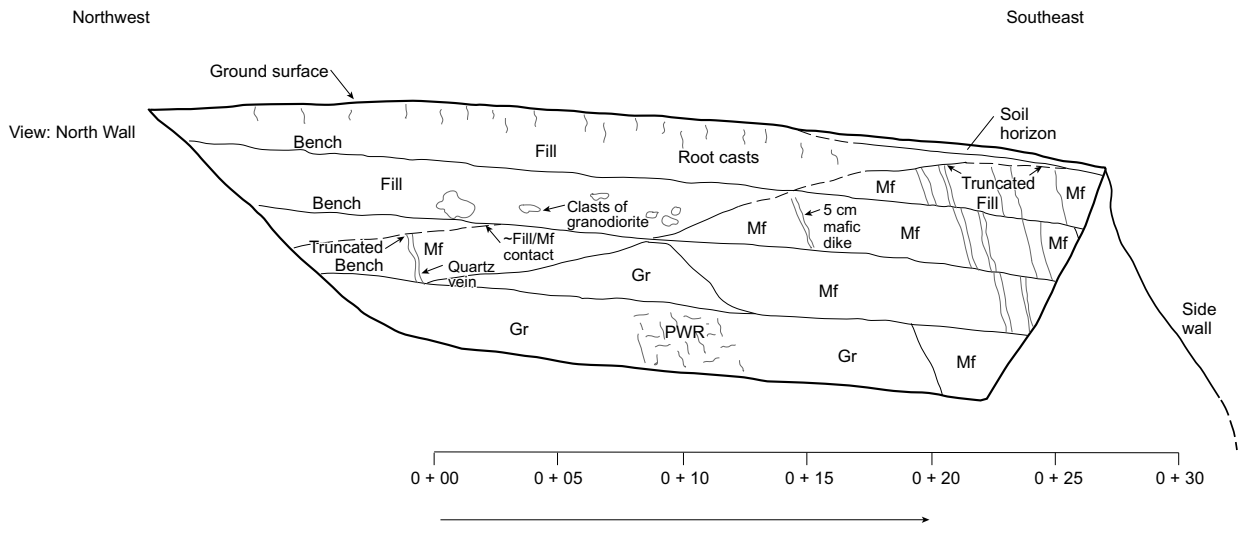
Northing	1166317
Easting	1846816
Elevation (ft MSL)	590

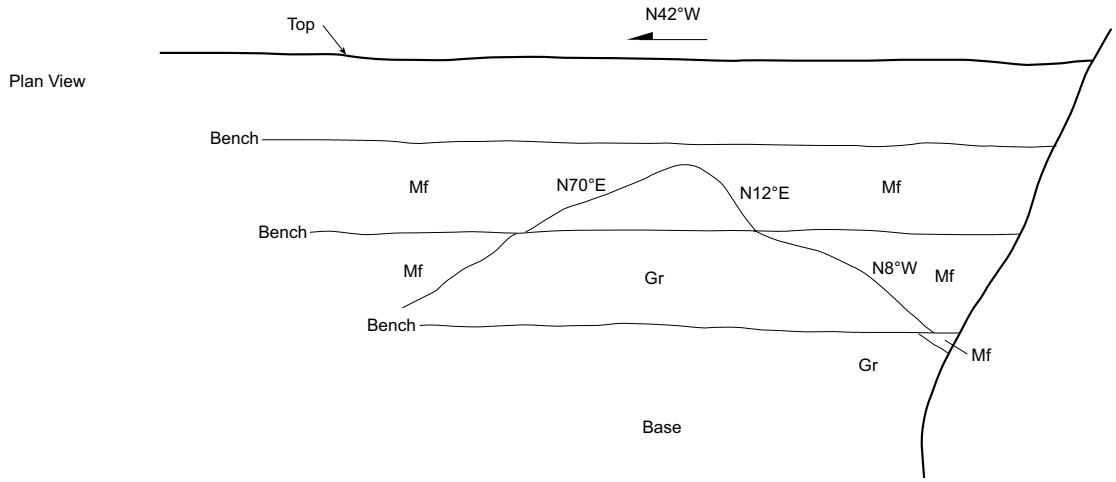
Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

DUKE LEE COL PROJECT

T-1401

WLA William Lettis & Associates, Inc.





Unit Descriptions

Gr (granitic saprolite)	Sandy silt (ML), to silt with fine sand, light gray (10YR 7/1), dry, very stiff, no dry strength, rapid dilatancy, nonplastic, >30% quartz sand, ~15% mica
Mf (mafic saprolite)	Silt (ML), brownish yellow (10YR 6/8), damp to dry, stiff, no dry strength, slow to rapid dilatancy, high to medium plasticity
PWR	Partially weathered rock

Northing	1166377
Easting	1846888
Elevation (ft MSL)	590

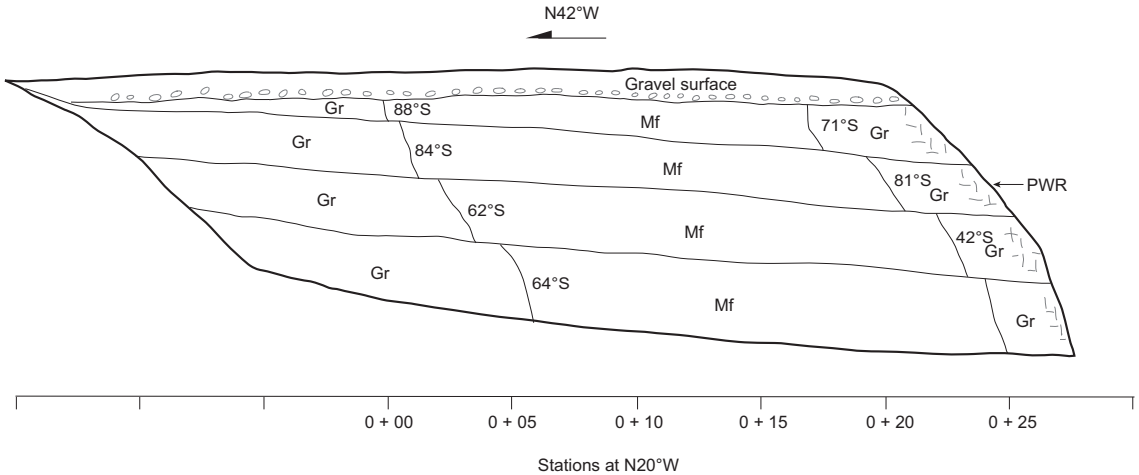
Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

DUKE LEE COL PROJECT

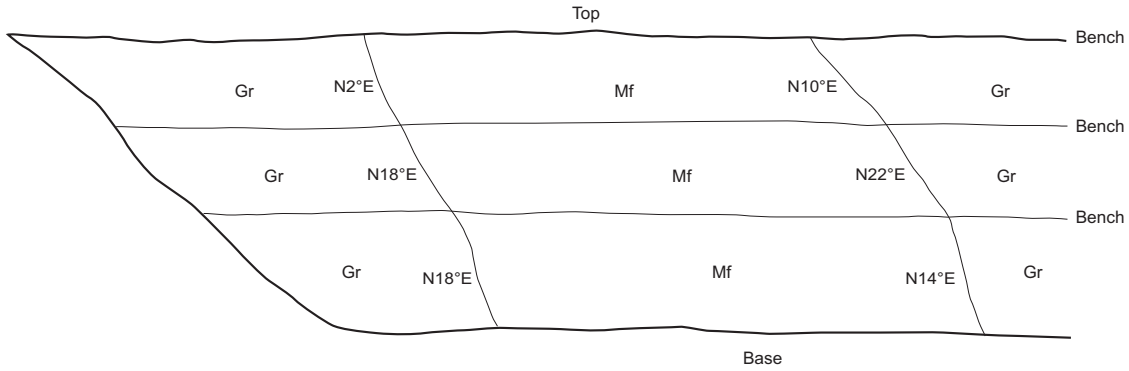
T-1402

WLA William Lettis & Associates, Inc.

View: looking northeast



Plan view



Unit Descriptions

GR (granitic saprolite)	Sandy silt (ML), light gray (10YR 7/1), dry, stiff to hard, quartz 15%,mica <5%, no dry strength, nonplastic, rapid dilatancy, slightly more lithified at southern end of test pit
Mf (mafic saprolite)	Silt (ML), yellowish brown (10YR 5/8), dry to damp, stiff to medium stiff, >50% fines, no dry strength, non-plastic, oxidation staining

Northing	1166394
Easting	1847141
Elevation (ft MSL)	590

Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

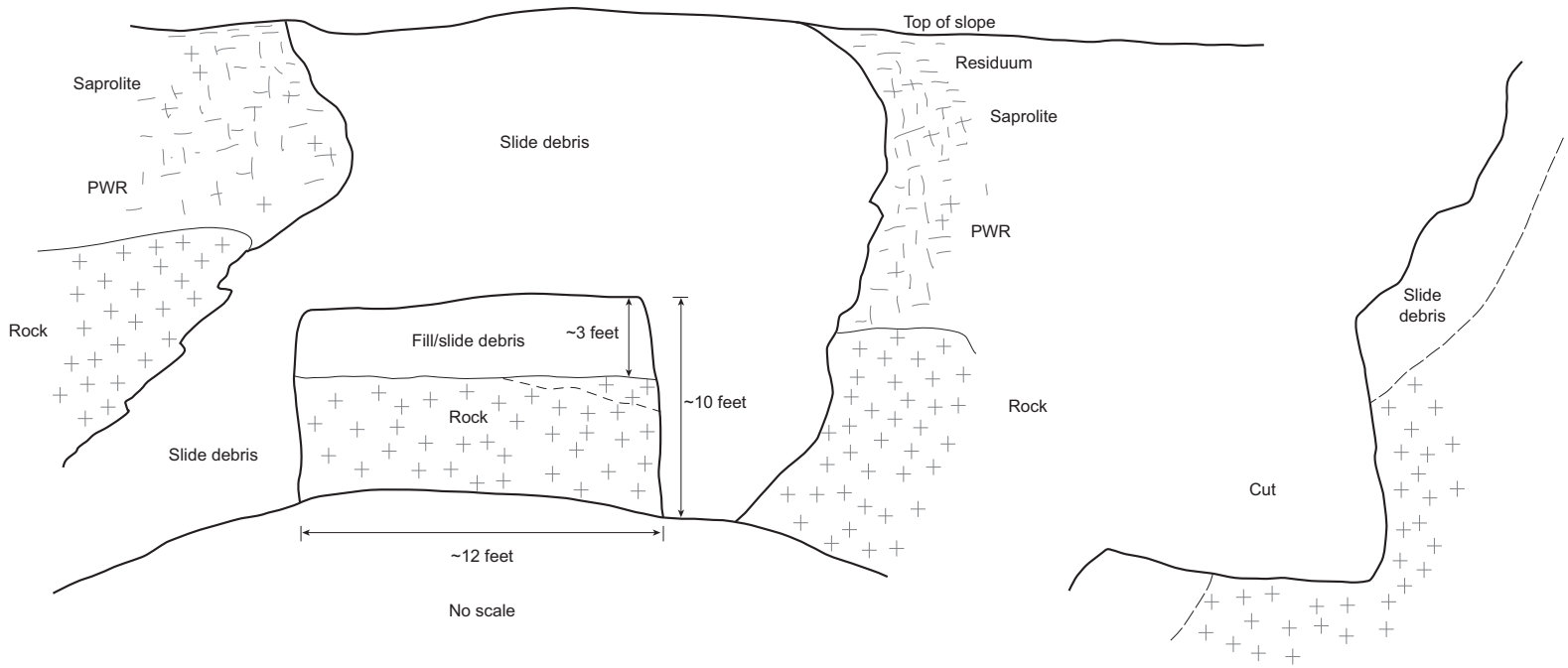
DUKE LEE COL PROJECT

T-1403

WLA William Lettis & Associates, Inc.

T-1404

Cut in northwest corner (old unit 2)



View: looking north

Side view

Northing	1166250
Easting	1846714
Elevation (ft MSL)	551

Notes: 1. Coordinate values represent northernmost corner of test pit or northernmost end of test pit trench.
2. Horizontal datum: South Carolina State Plane, NAD83 International feet.
3. Vertical datum: NAVD88.

DUKE LEE COL PROJECT

T-1404

WLA William Lettis & Associates, Inc.

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1419**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 near B-1056 N 1163896 E 1846789		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 642.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–6									ML	SILT very sandy (ML); red brown (7.5YR 6/4); dry; non plastic; micaceous; RESIDUAL SOIL	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	642–637
6–20				240	●	●	●		ML	SILT very sandy (ML); yellowish brown to gray (10YR 7/3); micaceous; relict rock fabric; SAPROLITE 51% fines, 49% sand	Saved three 5-gallon buckets of material (all identical) Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	636–623
20–40										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		622–603

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1420**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 near B-1058 N 1163582 E 1846854		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 638 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–4									ML	SILT (ML); red brown (2.5YR 5/8); dry to moist; some quartz blocks; non plastic; RESIDUAL SOIL	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	638–634
4–20									ML	SILT sandy (ML); light gray and yellow (10YR 7/3); dry; non plastic; few quartz blocks; micaceous; relict structure; SAPROLITE	Saved three 5-gallon buckets of material (all identical)	634–618
10				240	●	●	●			39% sand, 61% fines	Lab tests results represent a composite sample of entire test pit from 0 to 20 ft.	628
20–40										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		618–598

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1421**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area West of Former Motor Pool N 1164323 E 1845632		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 685.5 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/22/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/22/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0									ML	SILT (ML); red brown (10YR 3/5); dry; very fine sand; non plastic; micaceous; RESIDUAL SOIL		685
1												684
2												683
3												682
4												681
5												680
6											Saved three 5-gallon buckets of material (all identical)	679
7												678
8												677
9												676
10				240	●	●	●			54% fines, 26% sand, 20% gravel	Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	675
11												674
12												673
13												672
14												671
15												670
16												669
17												668
18												667
19									ML	SILT (ML); light brown, gray (7.5YR 6/3); relict rock fabric; non plastic; micaceous; quartzite vein noted; PARTIALLY WEATHERED ROCK		666
20										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		665
21												664
22												663
23												662
24												661
25												660
26												659
27												658
28												657
29												656
30												655
31												654
32												653
33												652
34												651
35												650
36												649
37												648
38												647
39												646
40												

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1422**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 N 1163992 E 1847171		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 630.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–2									ML	SILT sandy (ML); red brown; dry; very fine sand; some clay bands; moderately to non plastic; RESIDUAL SOIL	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	630–629
3–19									ML	SILT sandy (ML); yellowish brown mottled; dry; very fine sand; relict rock fabric; micaceous; SAPROLITE	Saved three 5-gallon buckets of material (all identical)	628–611
10				240	●	●	●			73% fines, 27% sand	Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	
20–40										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		610–591

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1423**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 N 1163666 E 1847256		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 625.8 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamu 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–5									ML	SILT (ML); red brown; little to no sand; trace root clasts	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	625–620
6–19									SM	SAND silty (SM); light gray, yellow; fine sand; trace rock fabric; micaceous; mottled appearance	Saved three 5-gallon buckets of material (all identical)	619–606
10				240	●	●	●			47% fines; 53% sand	Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	
20–40										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		605–586

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1424**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 N 1164081 E 1847436		Total Depth 19 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 628.3 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–6									ML	SILT (ML); red brown (7.5YR 7/3); dry; very fine sand < 5%; trace clay; RESIDUAL SOIL	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	628–622
6–15				228	●	●	●		ML	SILT sandy (ML); yellowish brown (2.5Y 5/3); dry; with relict rock fabric; SAPROLITE 62% fines; 38% sand	Saved three 5-gallon buckets of material (all identical) Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	622–613
15–19									ML	SILT sandy (ML); light brown, trace black; dry; relict fabric at bottom of hole; SAPROLITE; PARTIALLY WEATHERED ROCK?;		613–609
19–40										Test pit terminated at 19 ft. Test pit backfilled with excavated material after sampling		609–589

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1425**	
Type and Diameter of Boring Pit / NA	Boring Location Borrow Area 1 near B-1067 N 1163869 E 1847595		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 629.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/15/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/15/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–6									ML	SILT (ML); red brown (7.5YR 7/3); slightly moist; non plastic; RESIDUAL SOIL	Bulk sample of surficial soil placed in 5 gallon bucket labeled "surface sample".	629–624
7–13				240	●	●	●		ML	SILT sandy (ML); light tan, yellow (2.5Y 5/6); dry; fine sand; relict rock fabric; SAPROLITE 68% fines; 32% sand	Saved three 5-gallon buckets of material (all identical) Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	623–617
13–20									ML	SILT sandy (ML); light gray (2.5Y 5/4); dry; very fine; micaceous; SAPROLITE		616–610
20–40										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		609–590

Project Name and Job Number Lee Nuclear Station COL 6234-06-3389	MACTEC / WLA William Lettis & Associates, Inc.	**SOIL LOG - Boring No. T-1426**	
Type and Diameter of Boring Pit / NA	Boring Location Cooling Tower Pad - Former Unit 1 N 1166029 E 1845369		Total Depth 20 feet
Drilling Contractor and Rig Hall Construction / Trackhoe	Elevation and Datum 609.6 feet MSL	Ground Water Depth N/A	Depth to Bedrock N/A
Sampling Method Bulk	Sample Driving Hammer/Drop NA	No. of Samples 1	Date Started 5/22/06
	Borehole Inclination -90	Logged by F. Syms	Date Completed 5/22/06

Reviewed by / Date B. Reinicker 5/30/06

Reviewed by / Date C. Lamm 10-22-07

Depth (feet)	Sample	Sample Type & No.	Uncorrected Blows/6 inches	Recovery (inches)	Water Content	Grain Size	Atterberg Limits	Lithology	Soil Type (USCS)	Lithology	Remarks	Elevation (feet)
0–19									ML	SILT trace clay (ML); brown (7.5YR 5/6); dry; some stiff zones; moderately plastic; mottled; occasional rocks greated than 6 inch diameter; FILL	Saved three 5-gallon buckets of material (all identical)	609–590
10				240	●	●	●			71% fines; 26% sand	Lab tests results represent a composite sample of entire test pit from 0 to 20 ft	
20										Test pit terminated at 20 ft. Test pit backfilled with excavated material after sampling		589
21–40												588–570

APPENDIX 2AA
ATTACHMENT 4 – LEE NUCLEAR STATION PACKER TEST RESULTS

This attachment contains Packer Test results from four locations on the Lee site: B-1004, B-1015, MW-1201, and MW-1210. Tests were performed by MACTEC Engineering, Inc. Tabular as well as graphical representations of the data are included.

WLS COL 2.5-1

B-1004 Packer Test Data
Cherokee COL Site
MACTEC Project 6234-06-3389

Given Parameters

Test Section Length _, ft:	5
Radius of Borehole r_o, ft:	0.125
GW Elevation, ft:	10.25

Interval: 26-31

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	25.4	5	1.34	3.66	3.09	12.25	20.70
T2	29	6	1.79	4.21	4.13	12.25	21.97
T3	13.4	1	0.6	0.4	1.38	12.25	13.17

Q/H_o, GPM/ft	**1.24**
K_e, ft/year	**10,235**

Interval: 39-44

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	12.5	8	0.83	7.17	1.92	14.25	30.80
T4	18.4	14	1.22	12.78	2.82	14.25	43.74
T5	12.7	8	0.84	7.16	1.94	14.25	30.77
T6	5.3	8	0.33	7.67	0.76	14.25	31.95
T7	18	14	1.2	12.8	2.77	14.25	43.79
T8	21.1	17	1.45	15.55	3.35	14.25	50.13

Q/H_o, GPM/ft	**0.42**
K_e, ft/year	**3,467**

Note: T2 & T3 not conducted

Interval: 45-50

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	15	9	1.2	7.8	2.77	13.25	31.25
T4	4.6	7	0.4	6.6	0.92	13.25	28.48
T5	26.2	20	2.45	17.55	5.65	13.25	53.75
T6	1.73	13	0.14	12.86	0.32	13.25	42.93
T7	3.8	3	0.3	2.7	0.69	13.25	19.48

Q/H_o, GPM/ft	**0.41**
K_e, ft/year	**3,384**

Note: T2 & T3 not conducted

Notes:

Q = flow rate

Test ID, flow rate (GPM) and gauge pressure taken from field measurements. Head loss due to pipe taken from USBR Figure 17.4, confirmed based on field measurement.

P_g is equal to gauge pressure, P_f is equal to pressure loss due to pipe friction (psi), h_f is equal to head loss due to pipe friction (ft)

$H_{gravity}$ is equal to depth to water + height of surface pressure gauge above the datum (excess pressure due to weight of water in flowpipe)

$H_o = (P_g/\_{}_w) + H_{gravity} - h_f$

$K_e = ((Q/H_o)*(1/\_))*1/2\pi*\ln(R/r_o)*(525{,}600 \text{ min/year})*(.1337 \text{ ft}^3/\text{gal})$

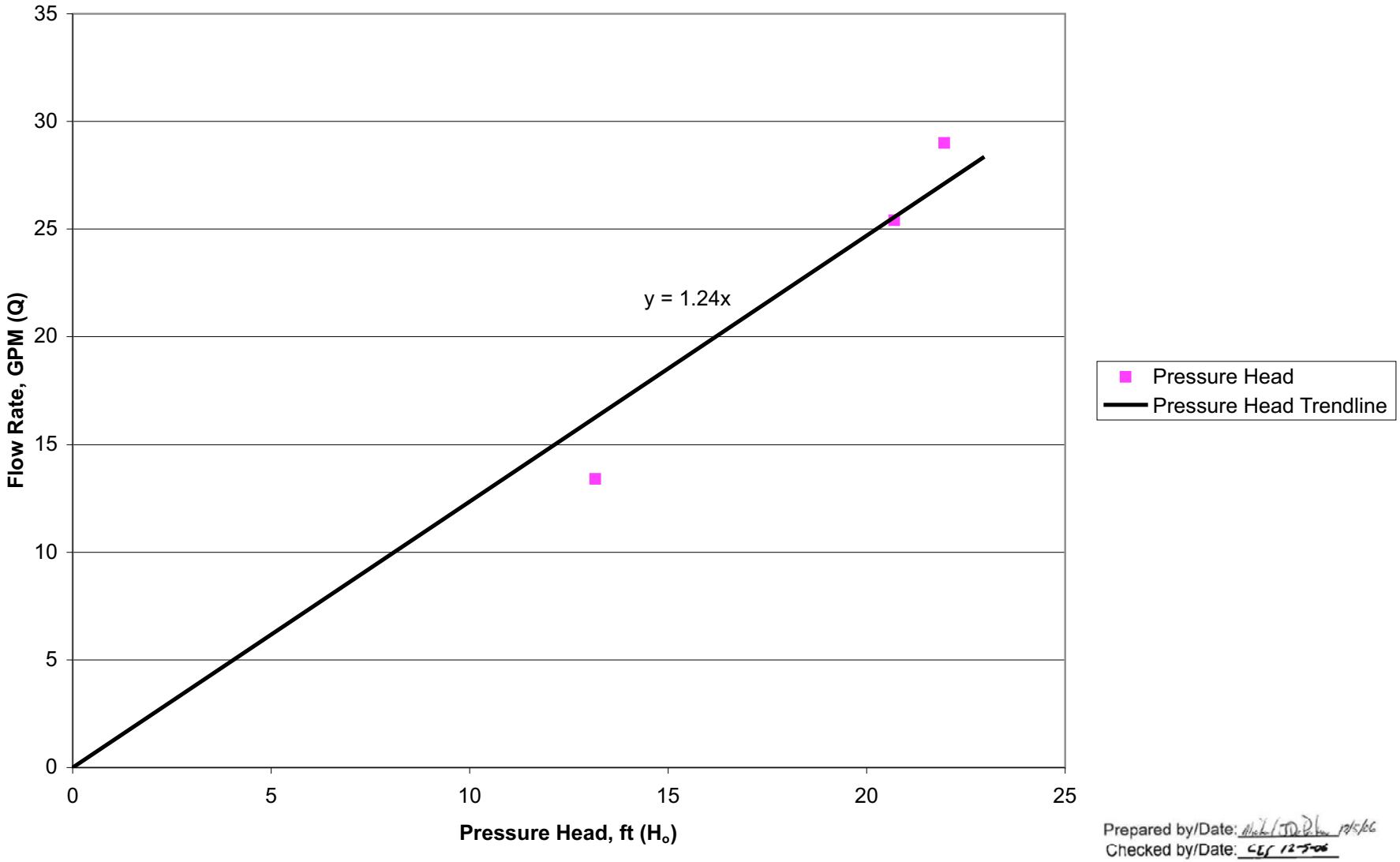
R is equal to total length between packers, _

Radius of borehole (r_o) taken from outside diameter of core bit, 3 inches

Q/H_o is equal to the slope of the linear trendline of H_o (x-axis) and Q (y-axis)

Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

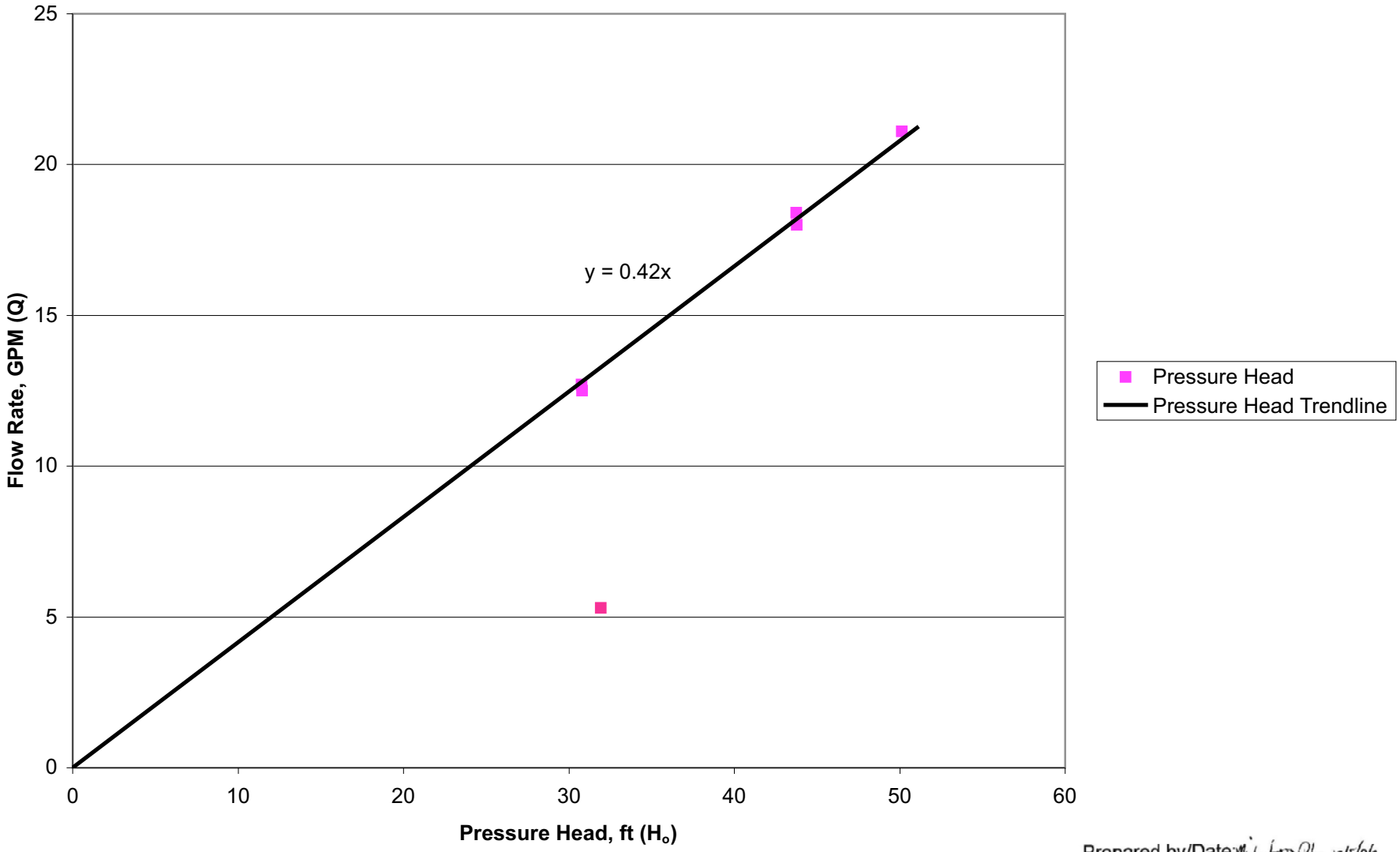
Pressure Head vs. Flow Rate, B-1004 Interval 26-31 ft. bls



Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CLS 12-5-06

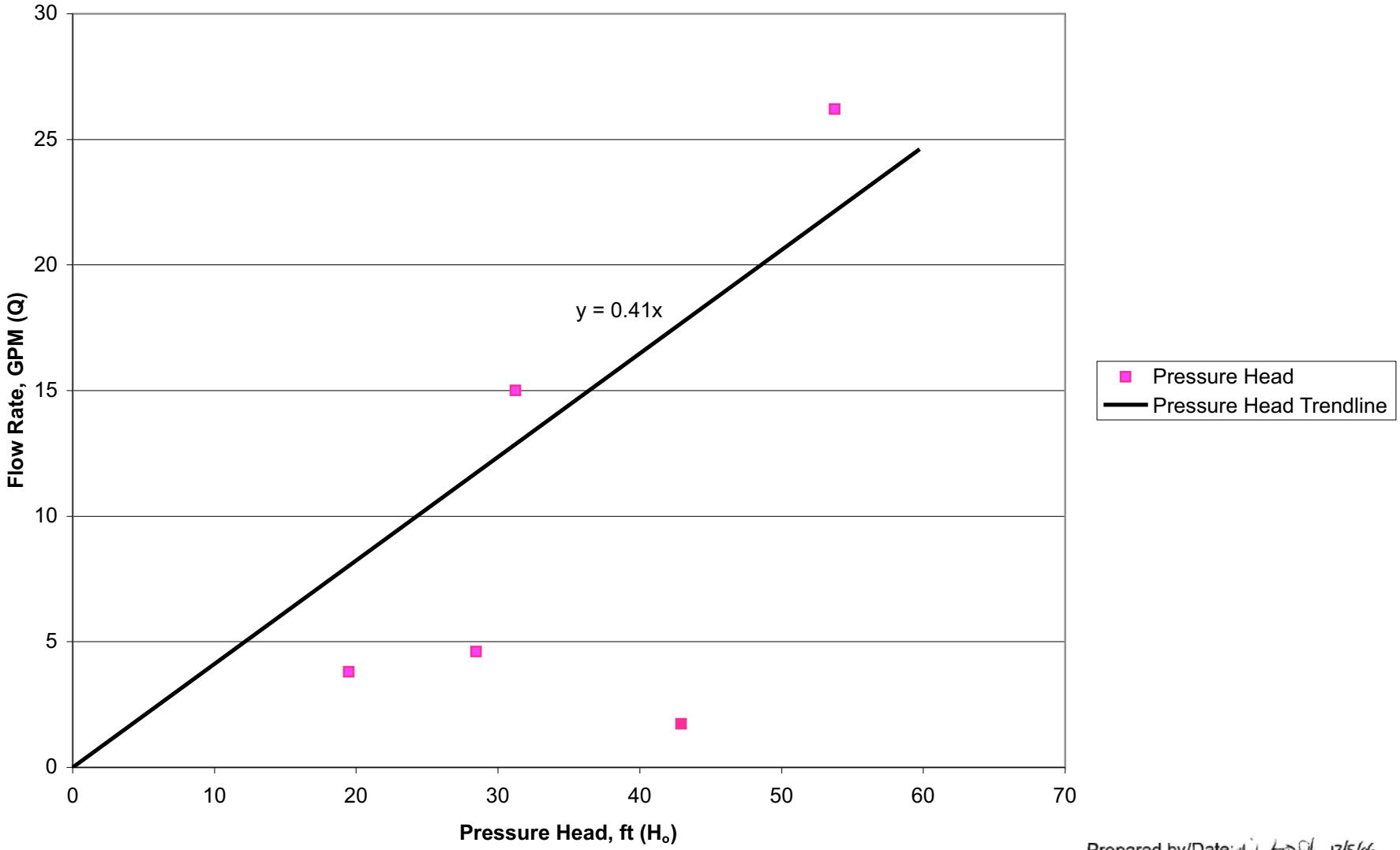
Attachment B: Table B-2
DCN: CH 248

Pressure Head vs. Flow Rate, B-1004 Interval 39-44 ft. bls



Prepared by/Date: 12/5/06
Checked by/Date:

Pressure Head Vs. Flow Rate, B-1004 Interval 45-50 ft. bls



Prepared by/Date: 12/5/06
Checked by/Date:

B-1015 Packer Test Data
Cherokee COL Site
MACTEC Project 6234-06-3389

Given Parameters

Test Section Length _, ft: 5
Radius of Borehole r_o, ft: 0.125
GW Elevation, ft: 8

Interval: 8.5-13.5

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	$H_{gravity}$, ft	H_o, ft
T1	0	1.5	0	1.5	0	13	16.46
T2	0	4.5	0	4.5	0	13	23.38
T3	0.05	10	0	10	0	13	36.08
T4	4.5	15	0.08	14.92	0.18	13	47.43

Q/H_o, GPM/ft **0.09**
K_e, ft/year **743**

Interval: 22-27

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	$H_{gravity}$, ft	H_o, ft
T1	1.56	5	0.04	4.96	0.09	11	22.45
T2	4	20	0.16	19.84	0.37	11	56.78
T3	9.5	25	0.4	24.6	0.92	11	67.77
T4	1.6	11	0.06	10.94	0.15	11	36.24

Q/H_o, GPM/ft **0.10**
K_e, ft/year **825**

Interval: 31-36

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	$H_{gravity}$, ft	H_o, ft
T1	1.8	7	0.05	6.95	0.12	12	28.04
T2	8.5	22	0.43	21.57	0.99	12	61.78
T3	19.2	40	1.6	38.4	3.69	12	100.62

Q/H_o, GPM/ft **0.17**
K_e, ft/year **1,403**

Notes:

Q = flow rate

Test ID, flow rate (GPM) and gauge pressure taken from field measurements. Head loss due to pipe taken from USBR Figure 17.4, confirmed based on field measurement.

P_g is equal to gauge pressure, P_f is equal to pressure loss due to pipe friction (psi), h_f is equal to head loss due to pipe friction (ft)

$H_{gravity}$ is equal to depth to water + height of surface pressure gauge above the datum (excess pressure due to weight of water in flowpipe)

$H_o = (P_g/\_w) + H_{gravity} - h_f$

$K_e = ((Q/H_o)*(1/\_))*1/2\pi*\ln(R/r_o)*(525{,}600 \text{ min/year})*(.1337 \text{ ft}^3/\text{gal})$

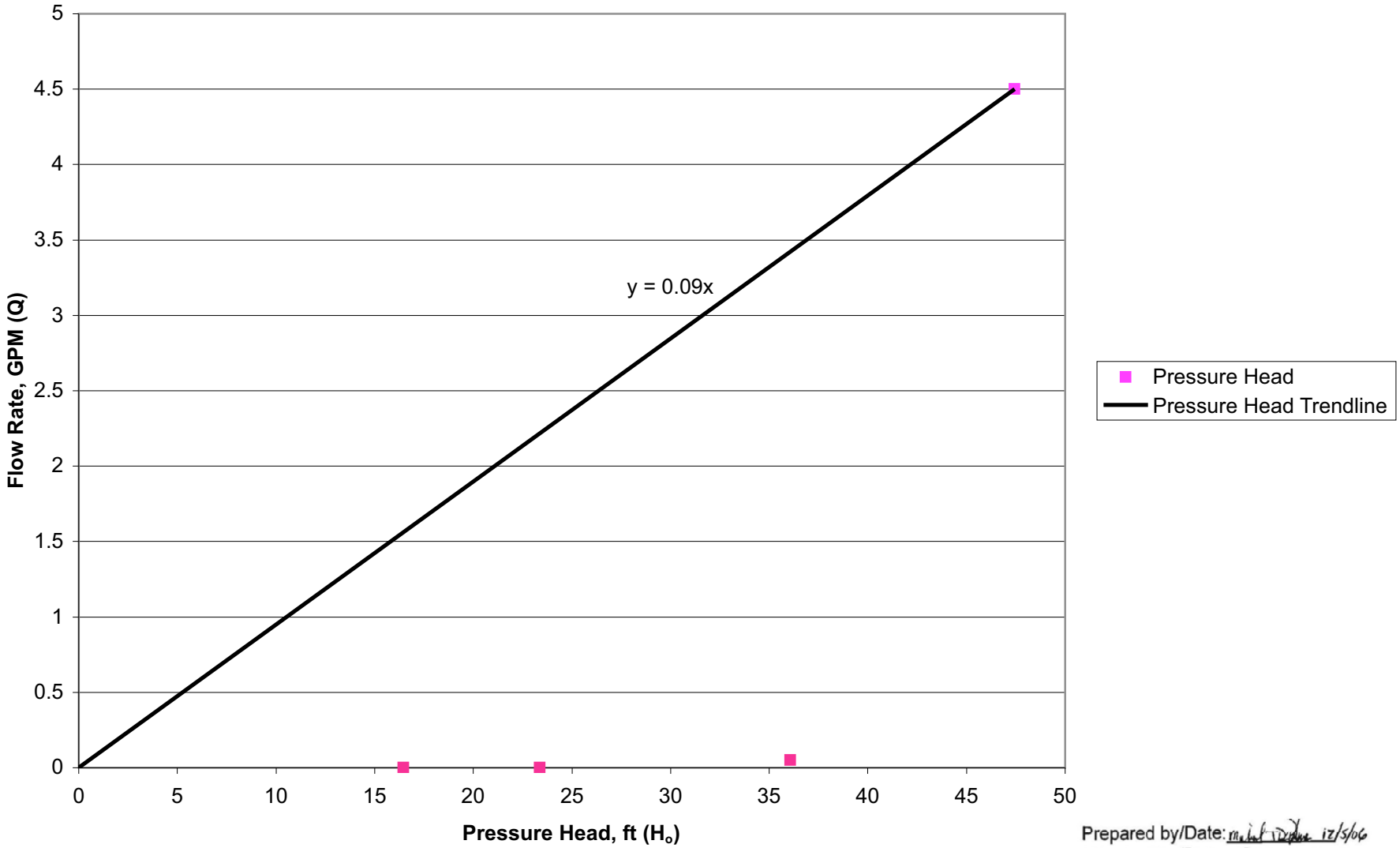
R is equal to total length between packers, _

Radius of borehole (r_o) taken from outside diameter of core bit, 3 inches

Q/H_o is equal to the slope of the linear trendline of H_o (x-axis) and Q (y-axis)

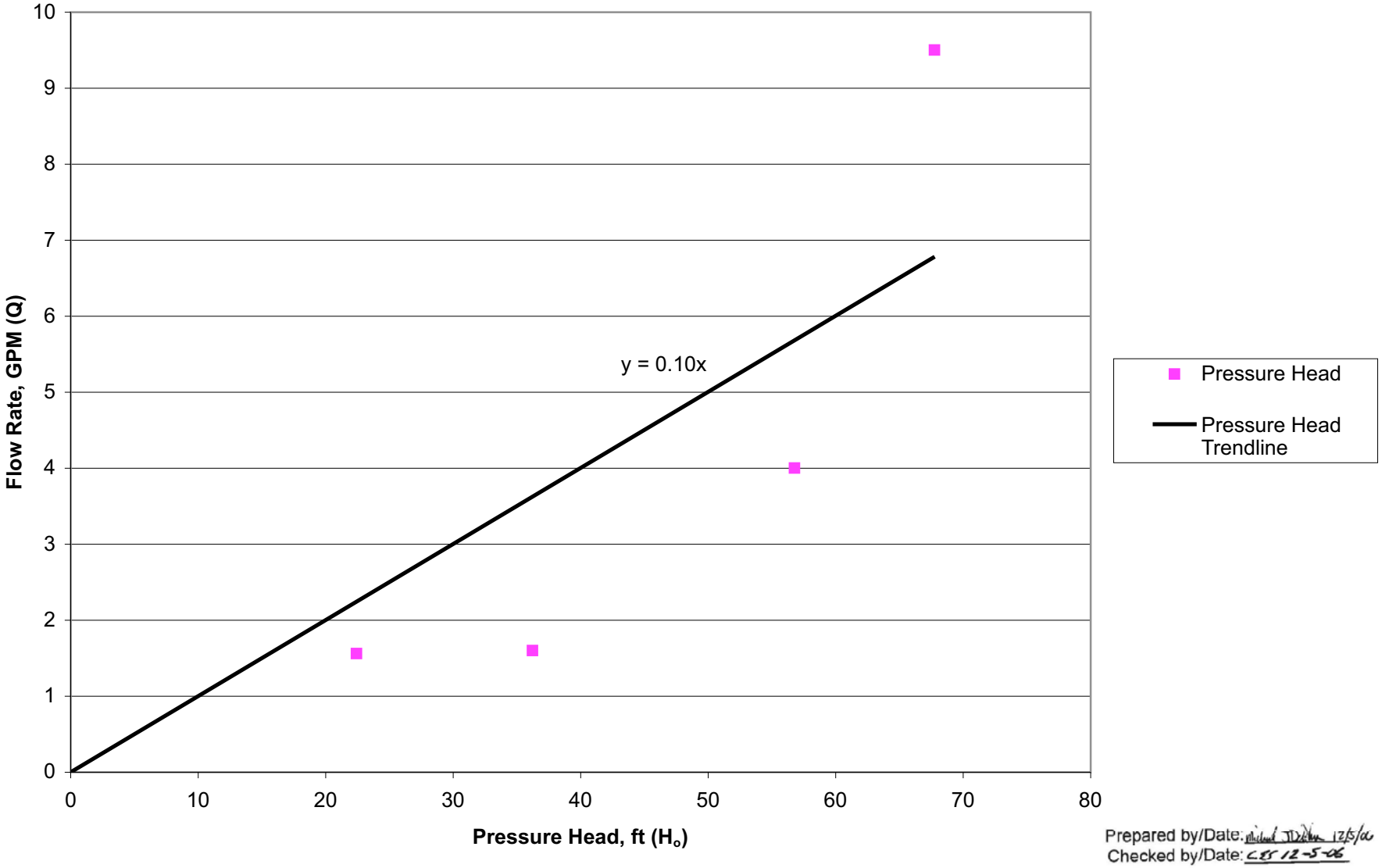
Prepared by/Date: [illegible] 12/5/06
Checked by/Date: [illegible] 12-5-06

Pressure Head vs. Flow Rate, B-1015 Interval 8.5-13.5 ft. bls



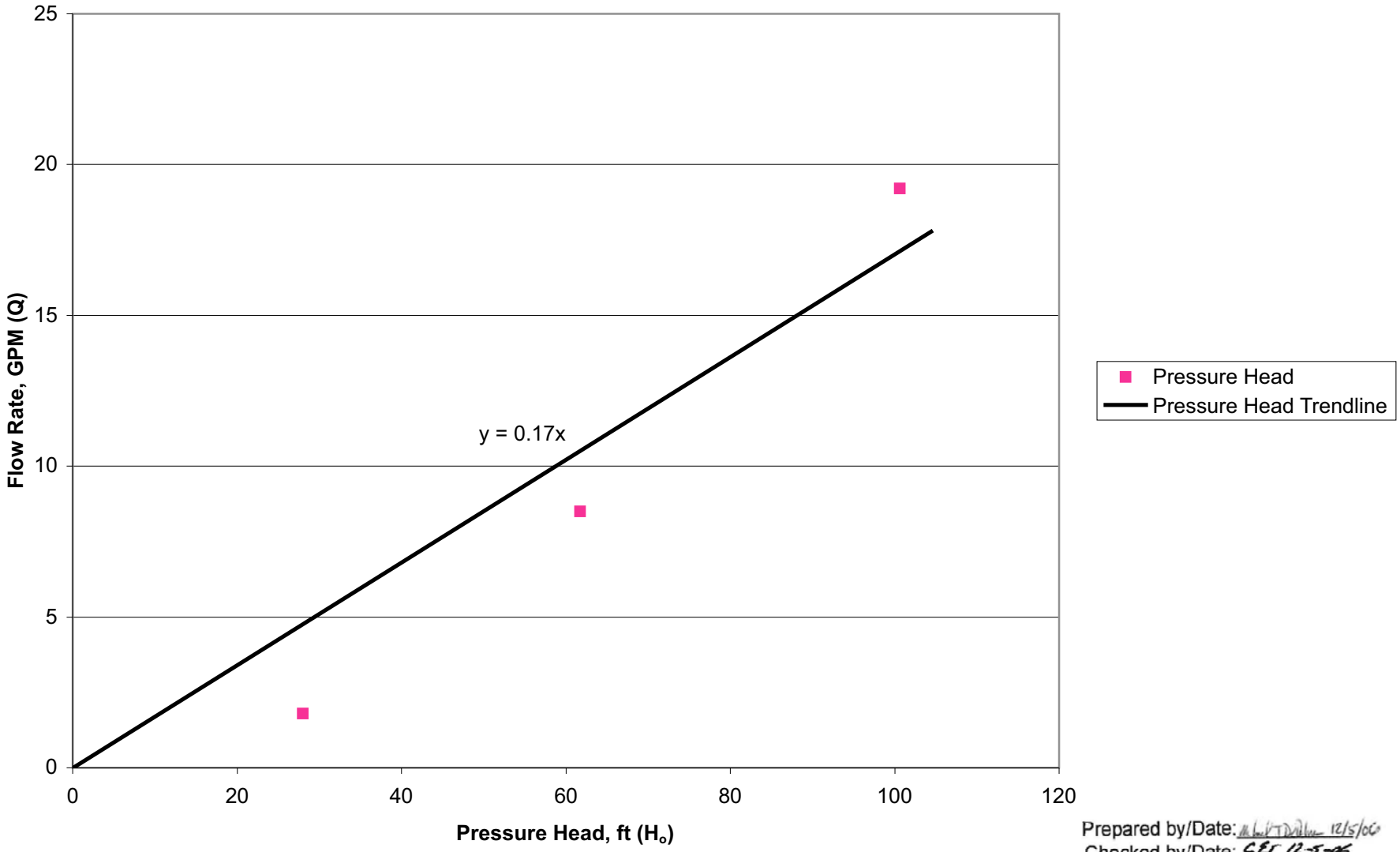
Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

Pressure Head vs. Flow Rate, B-1015 Interval 22-27 ft. bls



Prepared by/Date: 12/5/06
Checked by/Date: 12-5-06

Pressure Head vs. Flow Rate, B-1015 Interval 31-36 ft. bls



Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CEF 12-5-06

MW-1201 Packer Test Data
Cherokee COL Site
MACTEC Project 6234-06-3389

Given Parameters
Test Section Length _, ft: 10
Radius of Borehole r_o, ft: 0.125
GW Elevation, ft: 37

Interval: 87-97

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	1.03	11	0.21	10.79	0.48	40	64.90
T4/T5	1.86	20	0.28	19.72	0.65	40	85.51
T7	0.46	12	0.15	11.85	0.35	40	67.35
T8	1.93	24	0.31	23.69	0.72	40	94.67

Q/H_o, GPM/ft **0.020**
K_e, ft/year **98**

Note: T2 & T3 and T6 not conducted

Interval: 117-127

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	1.36	20	0.35	19.65	0.81	40	85.35
T4	2	30	0.39	29.61	0.90	40	108.33
T5	2.83	37	0.61	36.39	1.41	40	123.98
T6	0.13	15	0.2	14.8	0.46	40	74.15
T7	1.9	35	0.37	34.63	0.85	40	119.92
T8	2.16	41	0.39	40.61	0.90	40	133.72

Q/H_o, GPM/ft **0.018**
K_e, ft/year **88**

Note: T2 & T3 not conducted

Interval: 127-137

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	1.86	23	0.42	22.58	0.97	40	92.11
T4	2.63	23	0.61	22.39	1.41	40	91.67
T5	2.9	30	1.06	28.94	2.45	40	106.78
T6	1	15	0.02	14.98	0.04	40	74.58
T7	1.8	23	0.61	22.39	1.41	40	91.67

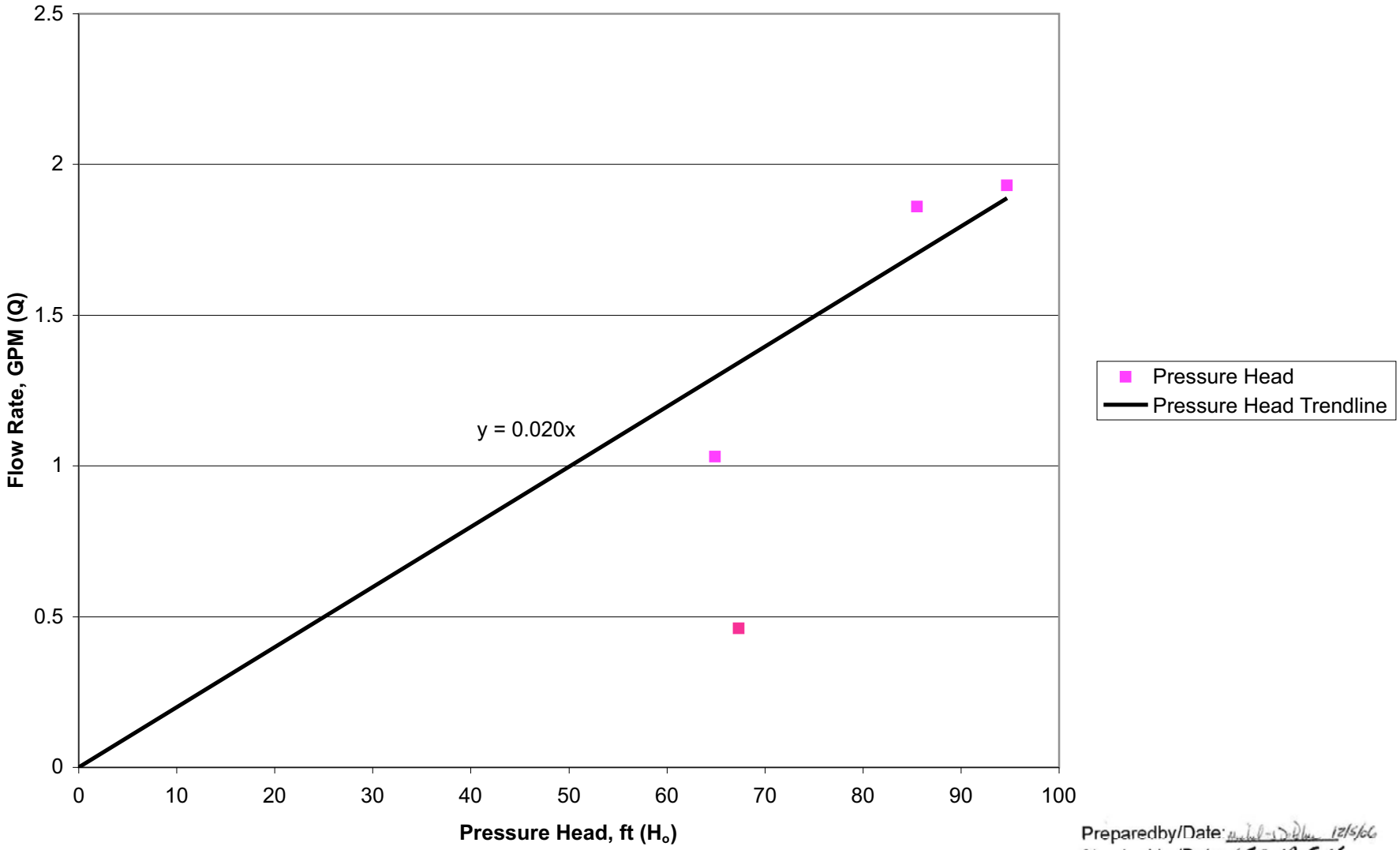
Q/H_o, GPM/ft **0.023**
K_e, ft/year **113**

Note: T2 & T3 and T8 not conducted

Notes:
Q = flow rate
Test ID, flow rate (GPM) and gauge pressure taken from field measurements. Head loss due to pipe taken from USBR Figure 17.4, confirmed based on field measurement.
P_g is equal to gauge pressure, P_f is equal to pressure loss due to pipe friction (psi), h_f is equal to head loss due to pipe friction (ft)
$H_{gravity}$ is equal to depth to water + height of surface pressure gauge above the datum (excess pressure due to weight of water in flowpipe)
$H_o = (P_g/\_{w}) + H_{gravity} - h_f$
$K_e = ((Q/H_o)*(1/\_))*1/2\pi*\ln(R/r_o)*(525{,}600 \text{ min/year})*(.1337 \text{ ft}^3/\text{gal})$
R is equal to total length between packers, _
Radius of borehole (r_o) taken from outside diameter of core bit, 3 inches
Q/H_o is equal to the slope of the linear trendline of H_o (x-axis) and Q (y-axis)

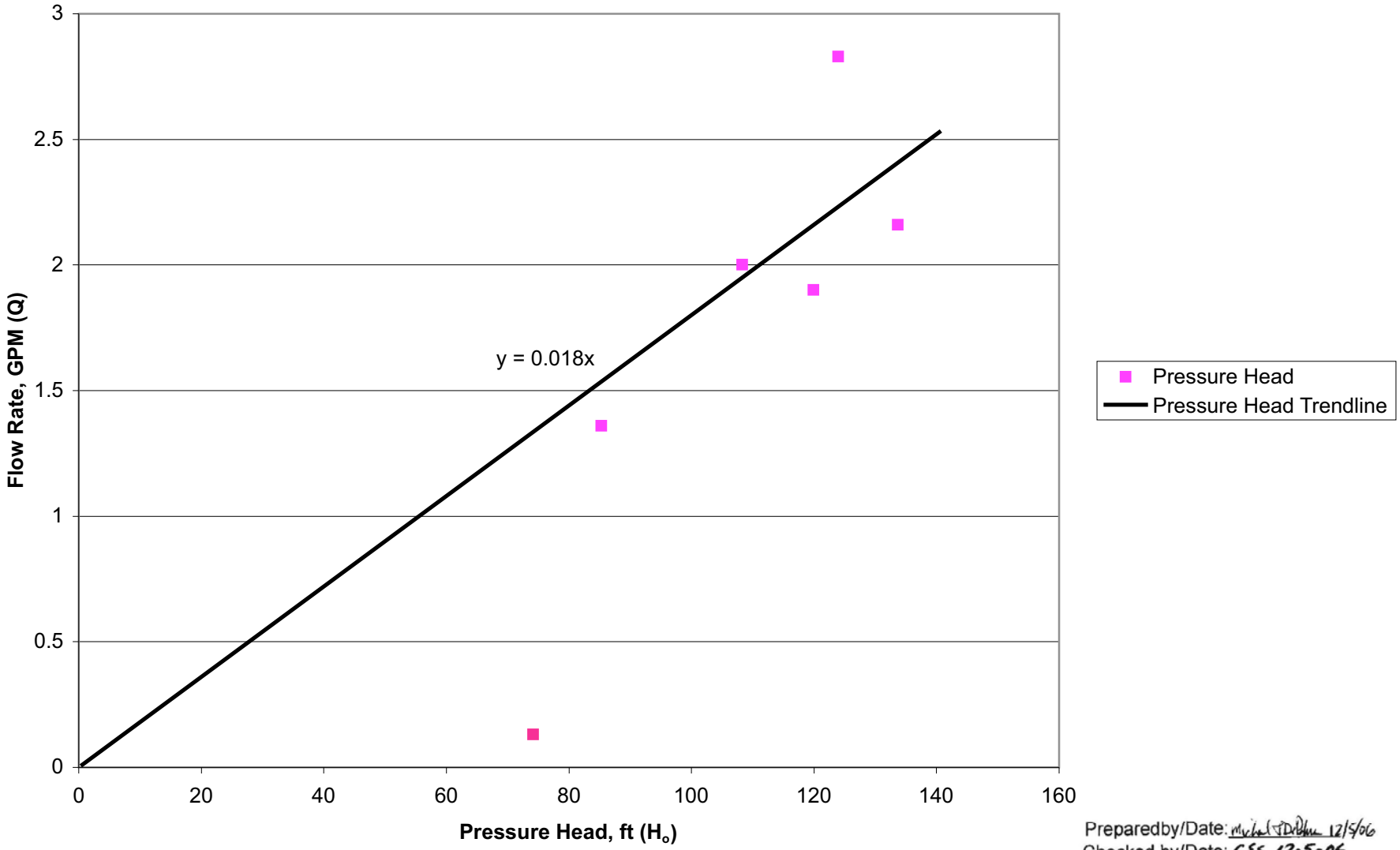
Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

Pressure Head vs. Flow Rate, MW-1201 Interval 87-97 ft. bls



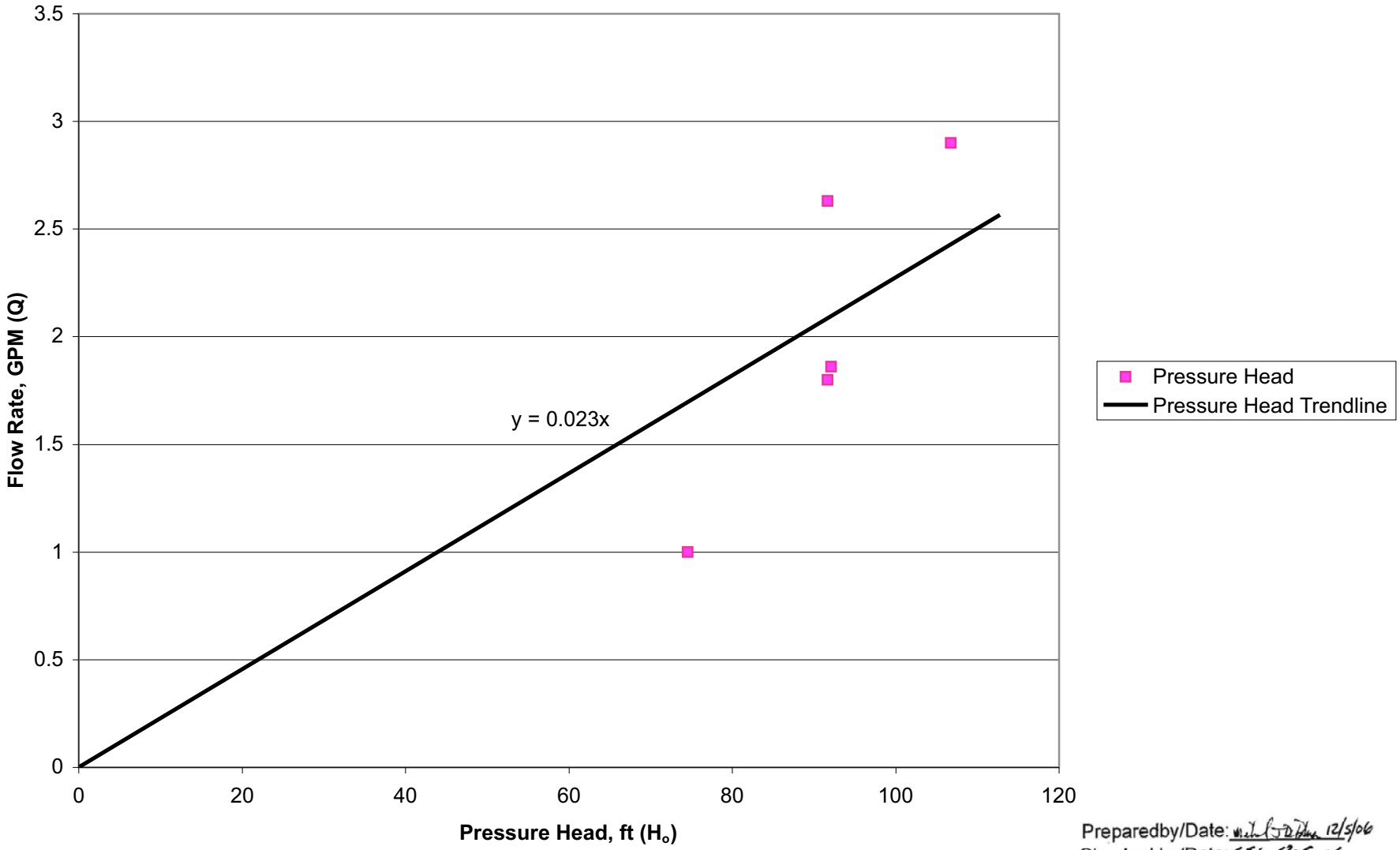
Preparedby/Date: 12/5/06
Checked by/Date: CES 12-5-06

Pressure Head vs. Flow Rate, MW-1201 Interval 117-127



Preparedby/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

Pressure Head Vs. Flow Rate, MW-1201 Interval 127-137



Preparedby/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

MW-1210 Packer Test Data
Cherokee COL Site
MACTEC Project 6234-06-3389

Given Parameters

Test Section Length _, ft: 10
Radius of Borehole r_o, ft: 0.125
GW Elevation, ft: 16.5

Interval: 96-106

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	27.5	17	6.06	10.94	13.98	20.5	45.75
T2	12.9	8	2.04	5.96	4.71	20.5	34.25
T3	4	9	0.99	8.01	2.28	20.5	38.98

Q/H_o, GPM/ft **0.388**
K_e, ft/year **1,902**

Interval: 105-115

Test ID	Q, GPM	Pg, psi	P_f, psi	P_g - P_f, psi	h_f, ft	H_g, ft	H_o, ft
T1	28	18	6.6	11.4	15.23	21.5	47.81
T2	17.8	9	3.85	5.15	8.88	21.5	33.38
T3	11.4	5	1.76	3.24	4.06	21.5	28.98
T4	6.3	19	1.06	17.94	2.44	21.5	62.91

Q/H_o, GPM/ft **0.534**
K_e, ft/year **2,618**

Notes:

Q = flow rate

Test ID, flow rate (GPM) and gauge pressure taken from field measurements. Head loss due to pipe taken from USBR Figure 17.4, confirmed based on field measurement.

P_g is equal to gauge pressure, P_f is equal to pressure loss due to pipe friction (psi), h_f is equal to head loss due to pipe friction (ft)

$H_{gravity}$ is equal to depth to water + height of surface pressure gauge above the datum (excess pressure due to weight of water in flowpipe)

$H_o = (P_g/\_{}_w) + H_{gravity} - h_f$

$K_e = ((Q/H_o)*(1/\_))*1/2\pi*\ln(R/r_o)*(525{,}600 \text{ min/year})*(.1337 \text{ ft}^3/\text{gal})$

R is equal to total length between packers, _

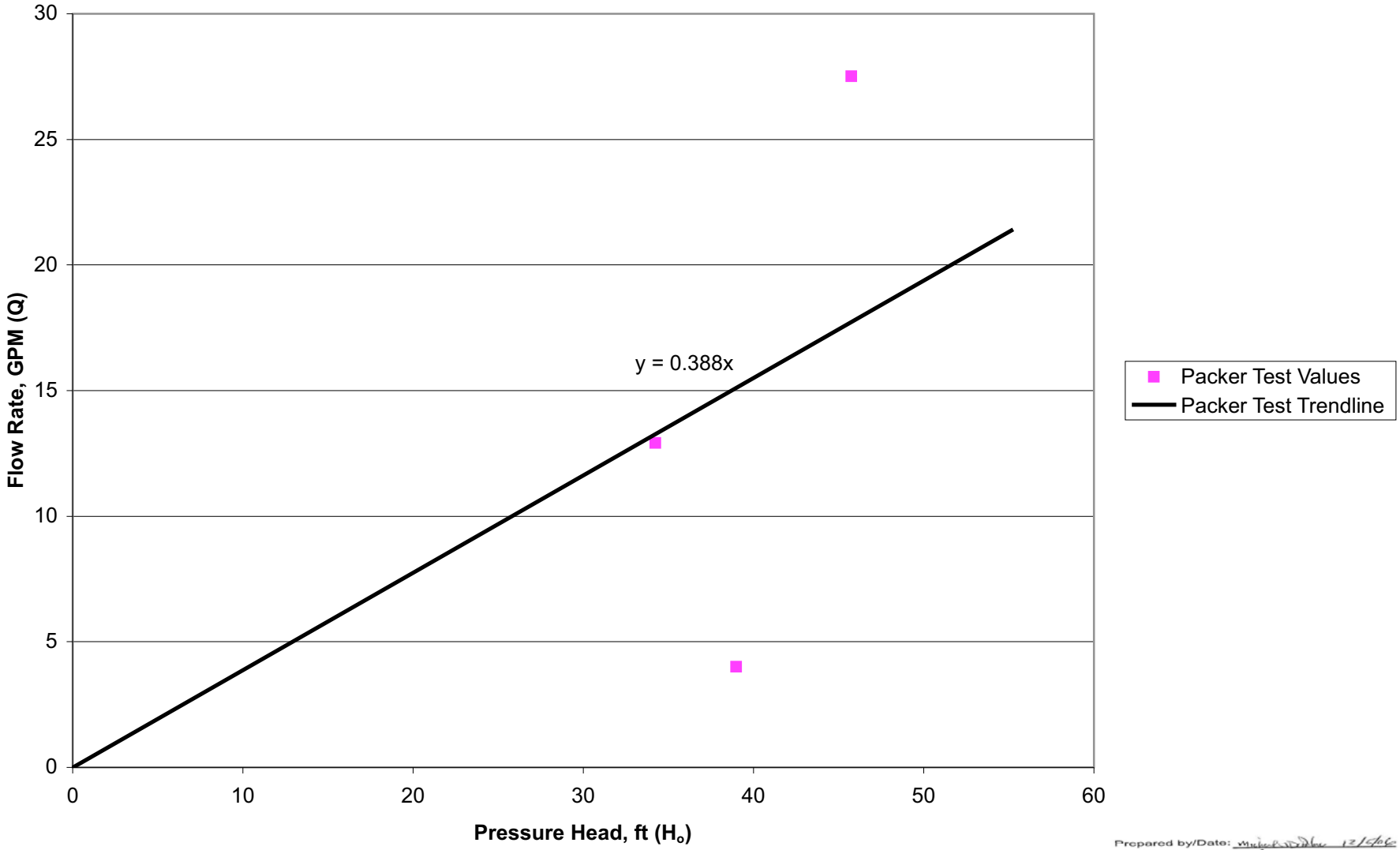
Radius of borehole (r_o) taken from outside diameter of core bit, 3 inches

Q/H_o is equal to the slope of the linear trendline of H_o (x-axis) and Q (y-axis)

Boring depth had caved to approximately 115 ft. bls prior to packer testing

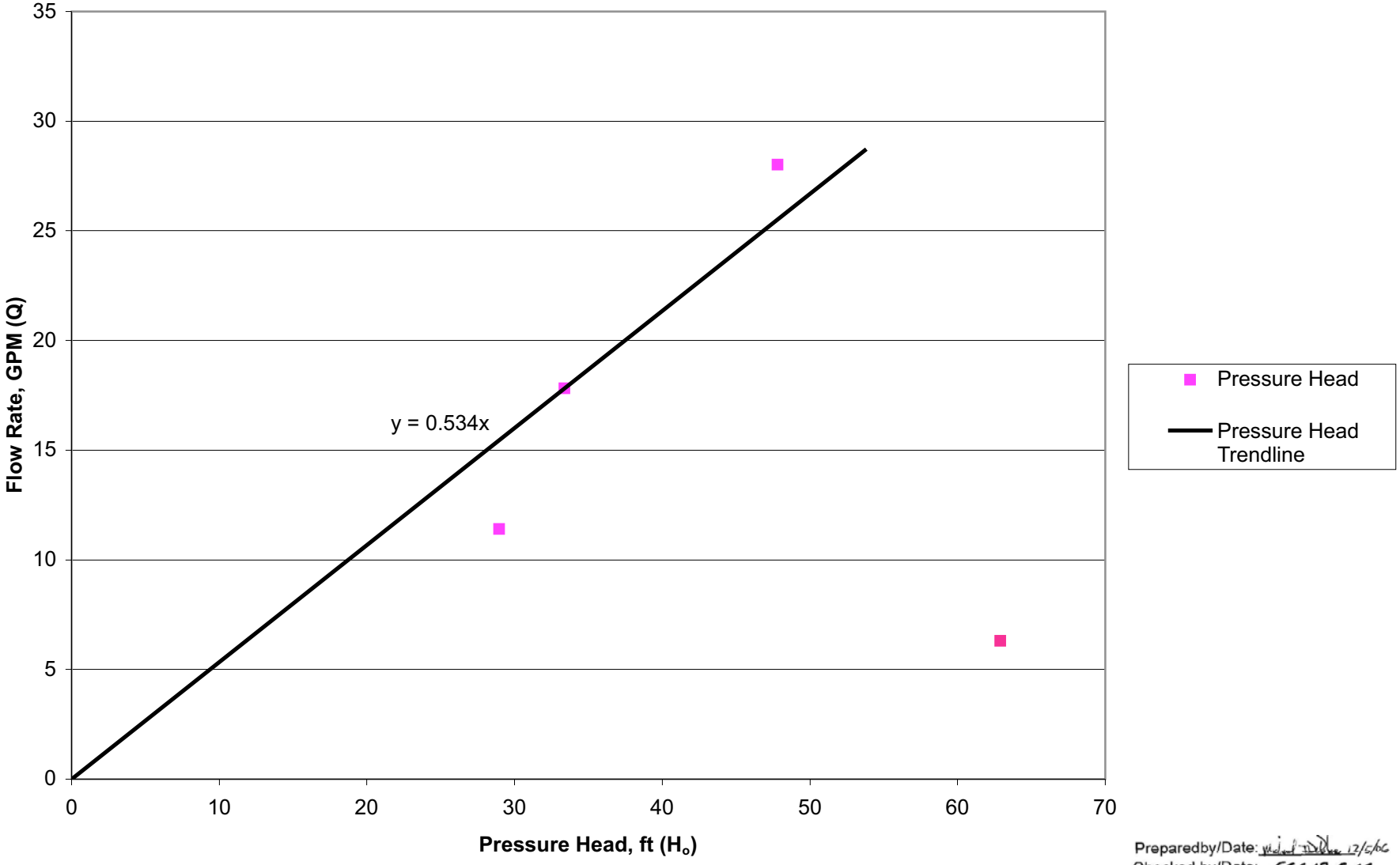
Prepared by/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

Pressure Head vs. Flow Rate, MW-1210 Interval 96-106



Prepared by/Date: [illegible] 12/6/06
Checked by/Date: CES 12-5-06

Pressure Head vs. Flow Rate, MW-1210 Interval 105-115



Preparedby/Date: [illegible] 12/5/06
Checked by/Date: CES 12-5-06

APPENDIX 2AA
ATTACHMENT 5 – LEE NUCLEAR STATION CONE PENETROMETER TEST (CPT) RESULTS

This attachment contains Cone Penetrometer Test (CPT) results from the Lee Nuclear Site. CPT tests were attempted at 29 locations. Seismic CPT tests were also attempted at 10 of these locations. Results are also included for Pore Pressure Dissipation Tests performed at 12 CPT locations. Tests were conducted by GREGG In Situ, Inc.

WLS COL 2.5-1

Cone Penetration Test Sounding Summary

-Table 1-

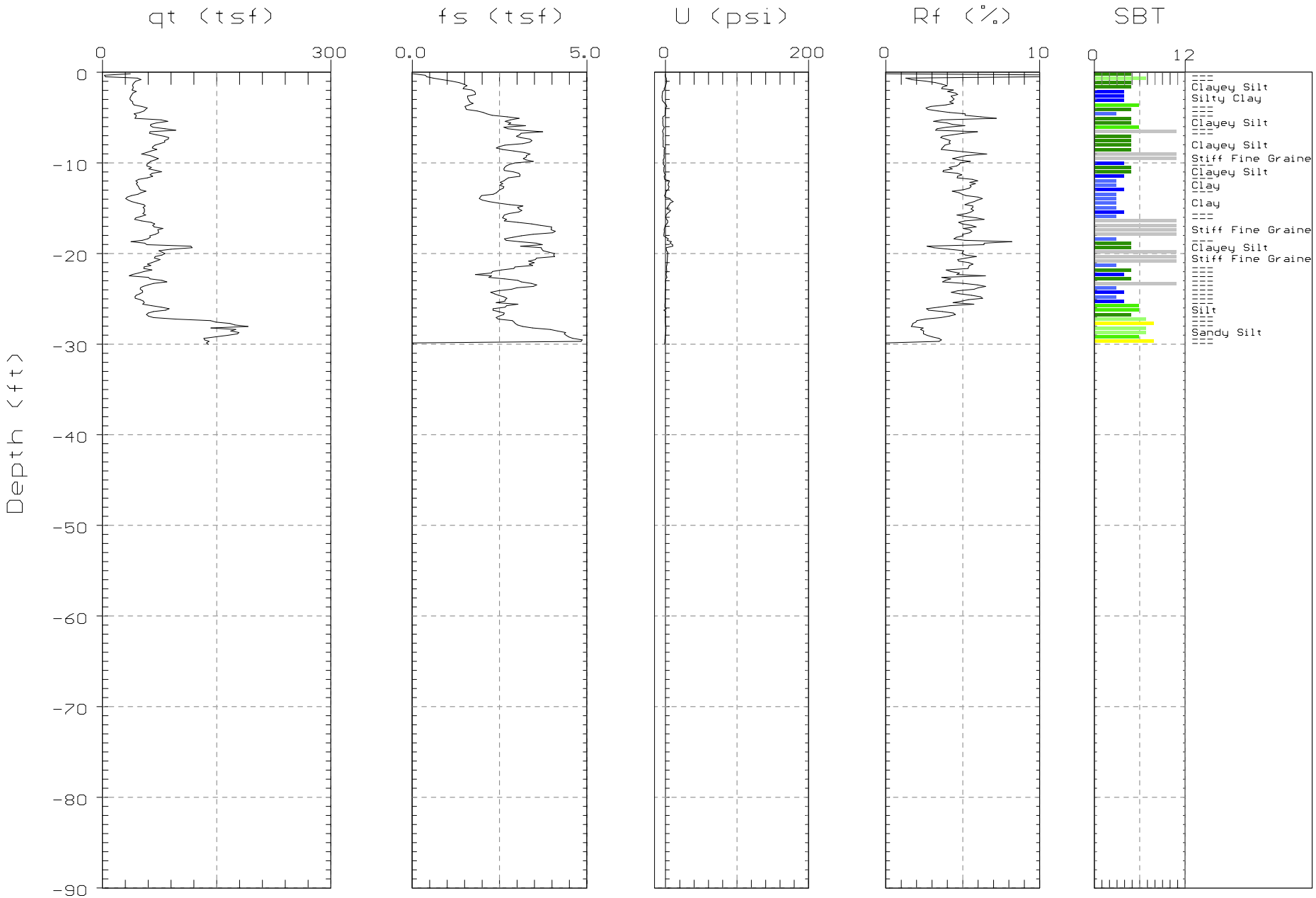
CPT Sounding Identification	File Name	Date	Termination Depth (Feet)	Depth of Soil Samples (Feet)	Depth of Pore Pressure Dissipation Tests (Feet)
CPT-1300	061c00	5/12/06	30	-	18.5, 30.0
CPT-1301	061c01	5/11/06	30	-	-
CPT-1302	061c02	5/12/06	80	-	34.9, 80.1
CPT-1303	061c03	5/13/06	90	-	65.9, 80.2
CPT-1304	061c04	5/12/06	74	-	74.0
CPT-1305	061c05	5/12/06	34	-	-
CPT-1306	061c06	5/12/06	19	-	-
CPT-1306a	061c6a	5/12/06	21	-	-
CPT-1307	061c07	5/16/06	20	-	-
CPT-1308	061c08	5/13/06	8	-	-
CPT-1308a	061c08a	5/14/06	41	-	41.2
CPT-1308b	061c08b	5/16/06	39.5	-	-
CPT-1309	061c09	5/14/06	85	-	60.0, 85.1
CPT-1314	061c14	5/15/06	6	-	-
CPT-1315	061c15	5/15/06	40	-	-
CPT-1316	061c16	5/15/06	57.6	-	-
CPT-1317	061c17	5/15/06	8.7	-	-
CPT-1317a	061c17a	5/15/06	19.5	-	-
CPT-1317b	061c17b	5/16/06	20.7	-	-
CPT-1318	061c18	5/15/06	16	-	-
CPT-1319	061c19	5/15/06	47.6	-	-
CPT-1320	094c1320	8/20/06	32.3	-	32.2
CPT-1321	094c1321	8/20/06	43.3	-	43.3

CPT-1322	094c1322	8/20/06	48.1	-	48.1
CPT-1323	094c1323	8/19/06	84.2	-	81.0, 84.2
CPT-1324	094c1324	8/19/06	3.1	-	-
CPT-1324b	094c1324b	8/19/06	77.3	-	77.3
CPT-1325	094c1325	8/19/06	40.0	-	-
CPT-1325a	094c1325a	8/19/06	55.1	-	55.1

GREGG

MACTEC

Site: N=1165285.875E=1845003.07 Engineer: C.SAMS
Location: CPT-1300L=609.2 Date: 05:12:06 06:35



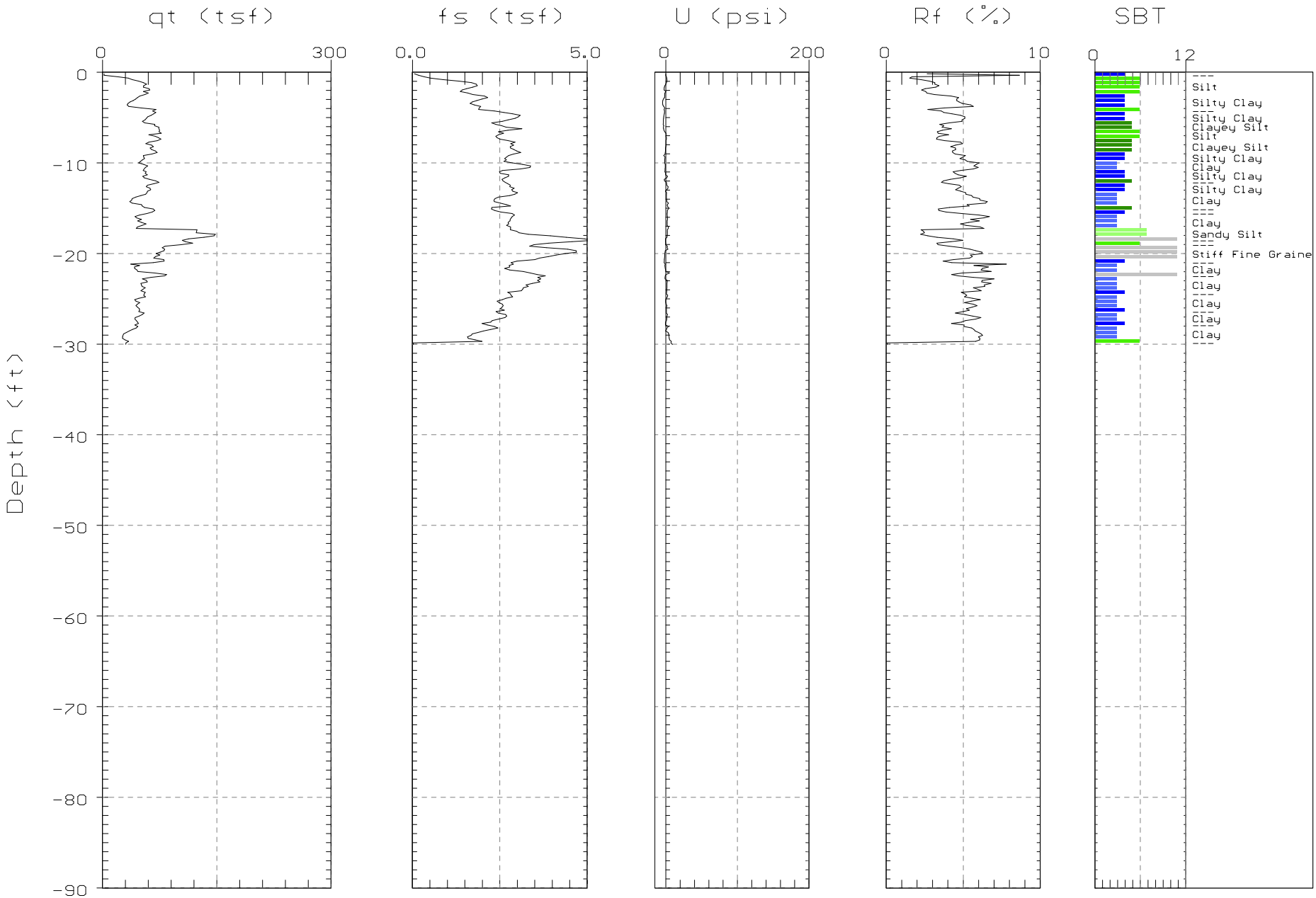
Max. Depth: 30.02 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164894.228E=1845085.762 Engineer: C.SAMS
Location: CPT-1301L=609.8 Date: 05/11/06 14:37



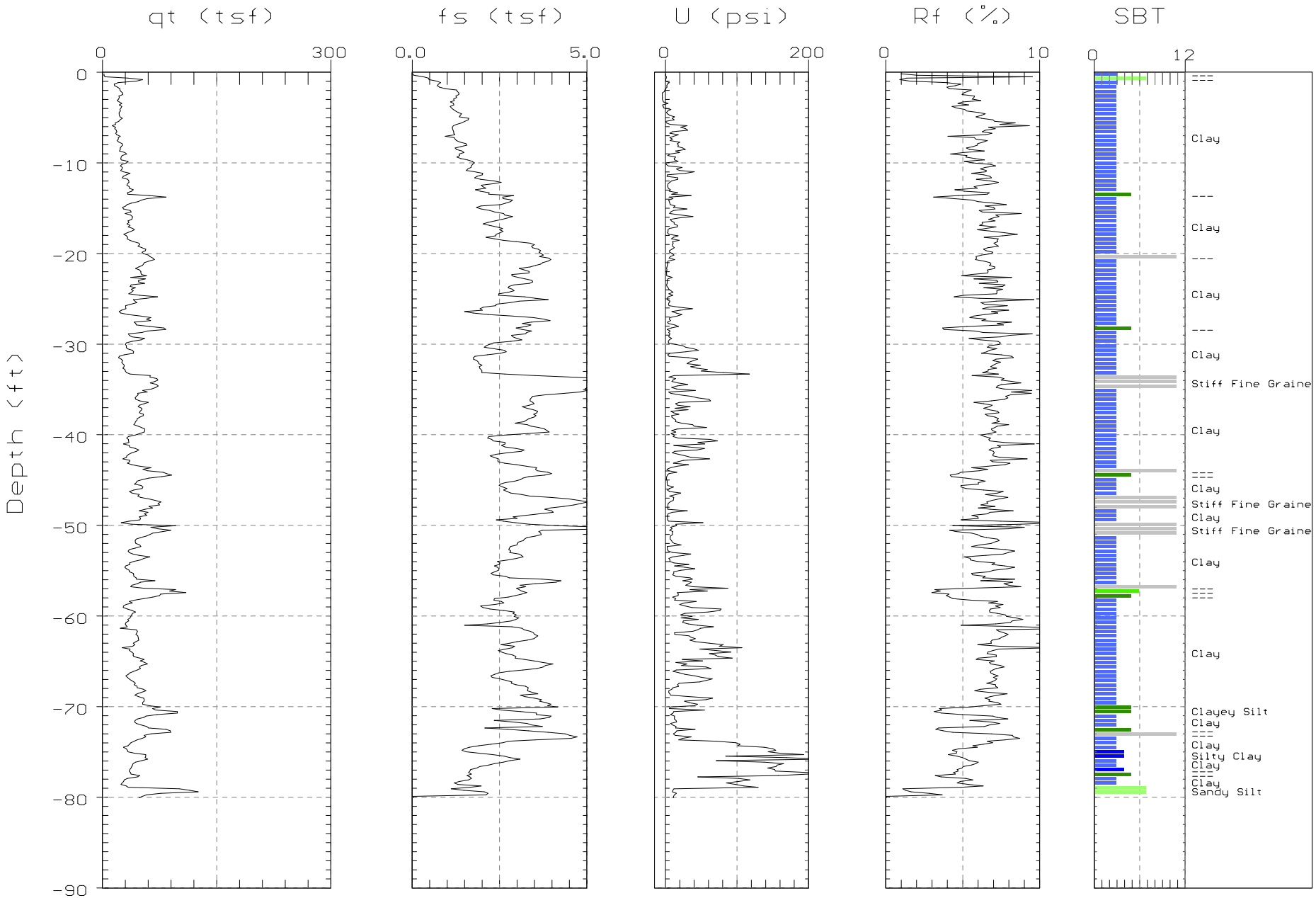
Max. Depth: 30.02 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166124.625E=1848040.224 Engineer: C.SAMS
Location: CPT-1302L=609.3 Date: 05/12/06 11:13



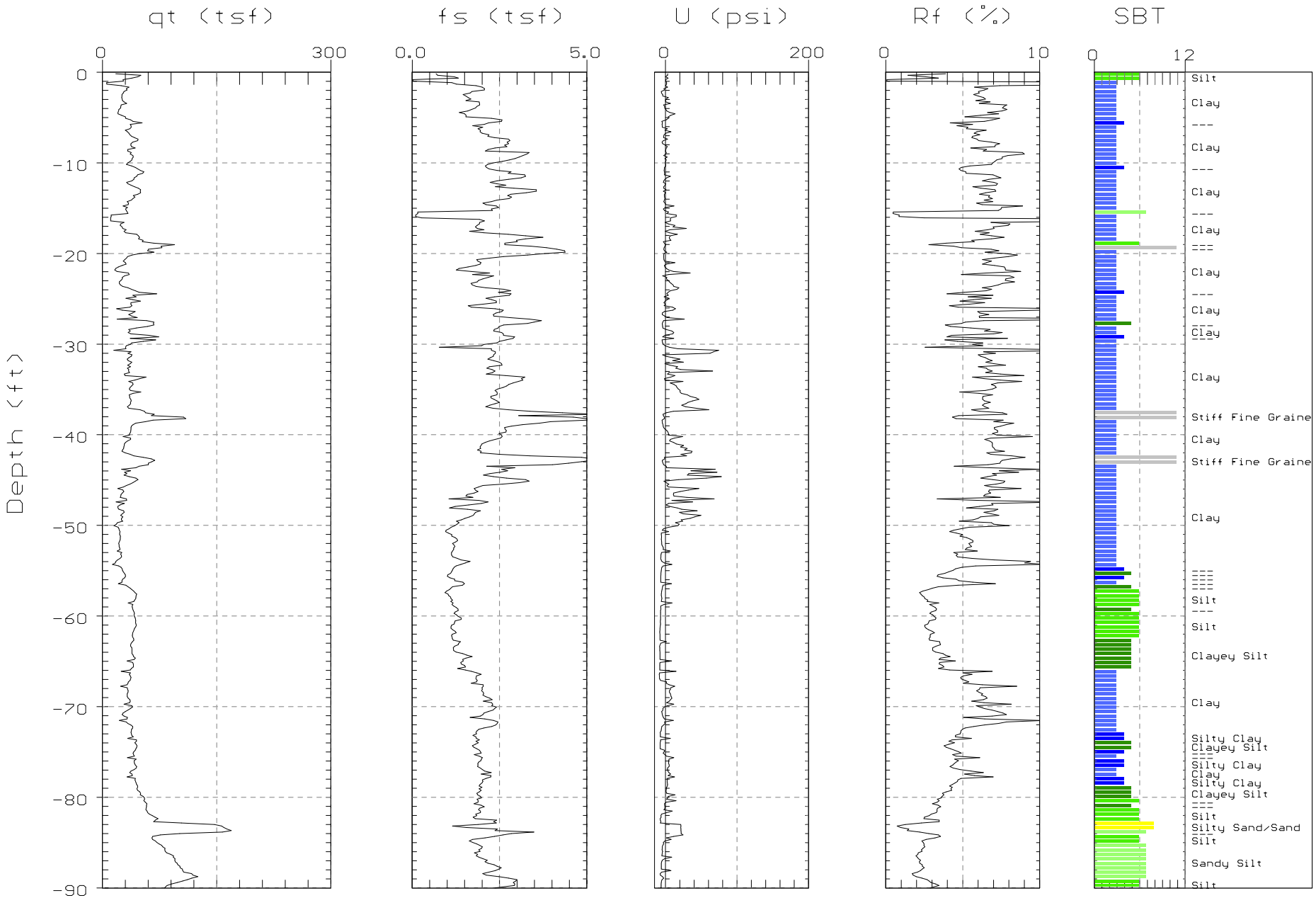
Max. Depth: 80.05 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165582.495E=1848103.244 Engineer: C.SAMS
Location: CPT-1303L=609.6 Date: 05/13/06 08:30



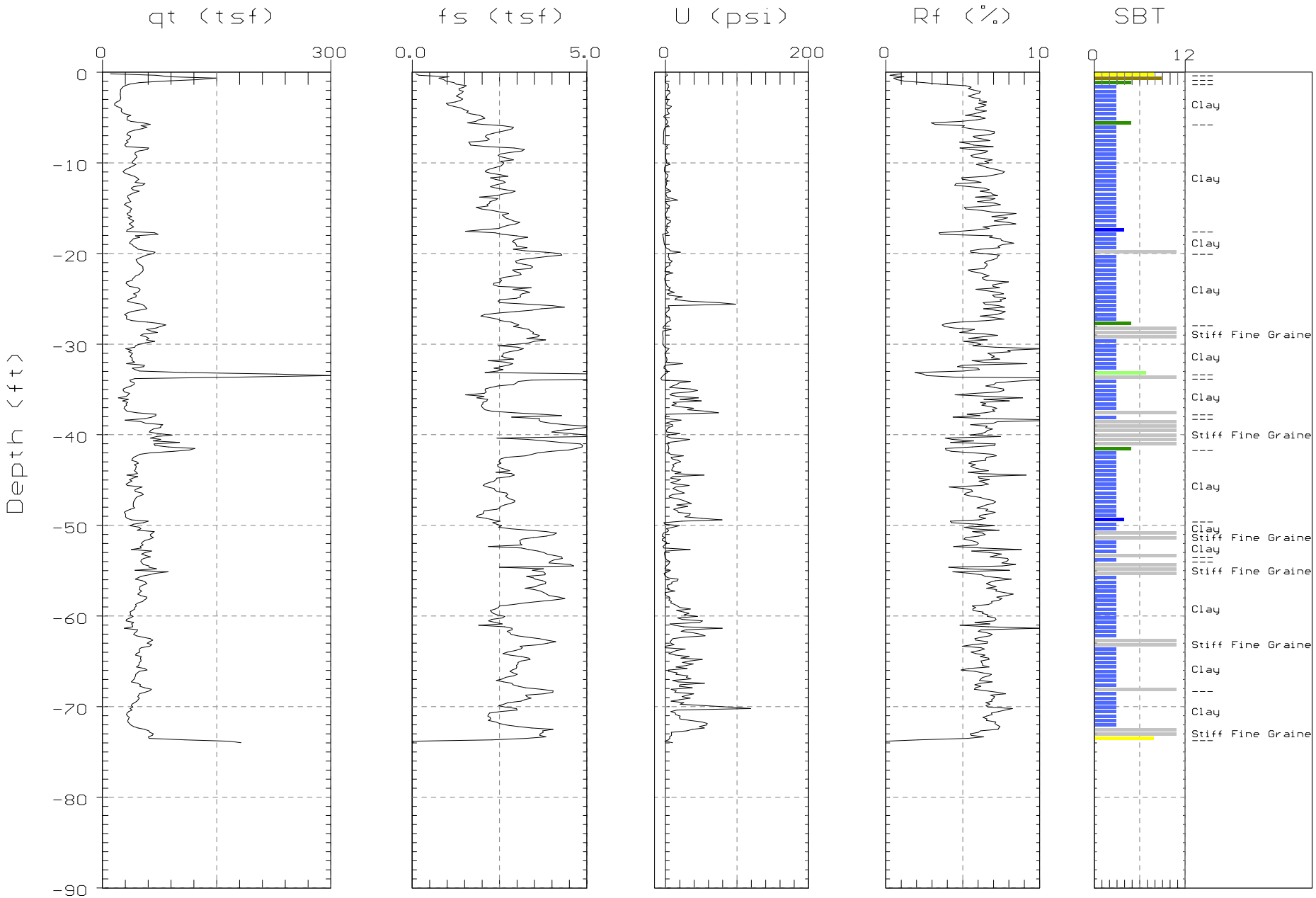
Max. Depth: 90.55 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165892.587E=1848181.888 Engineer: C.SAMS
Location: CPT-1304L=609.8 Date: 05/12/06 13:23



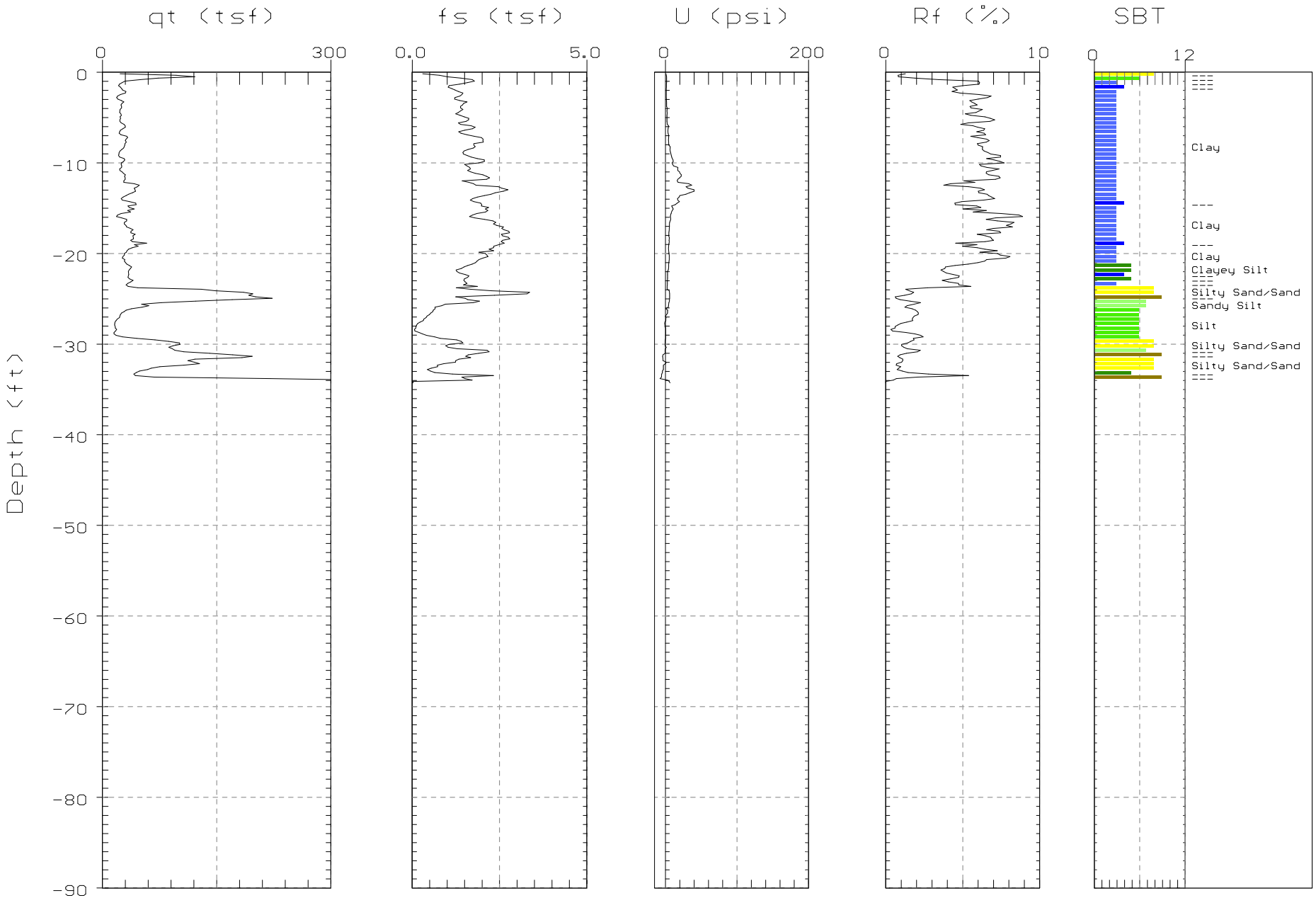
Max. Depth: 73.98 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164732.401E=1847452.326 Engineer: C.SAMS
Location: CPT-1305L=603.7 Date: 05/12/06 08:29



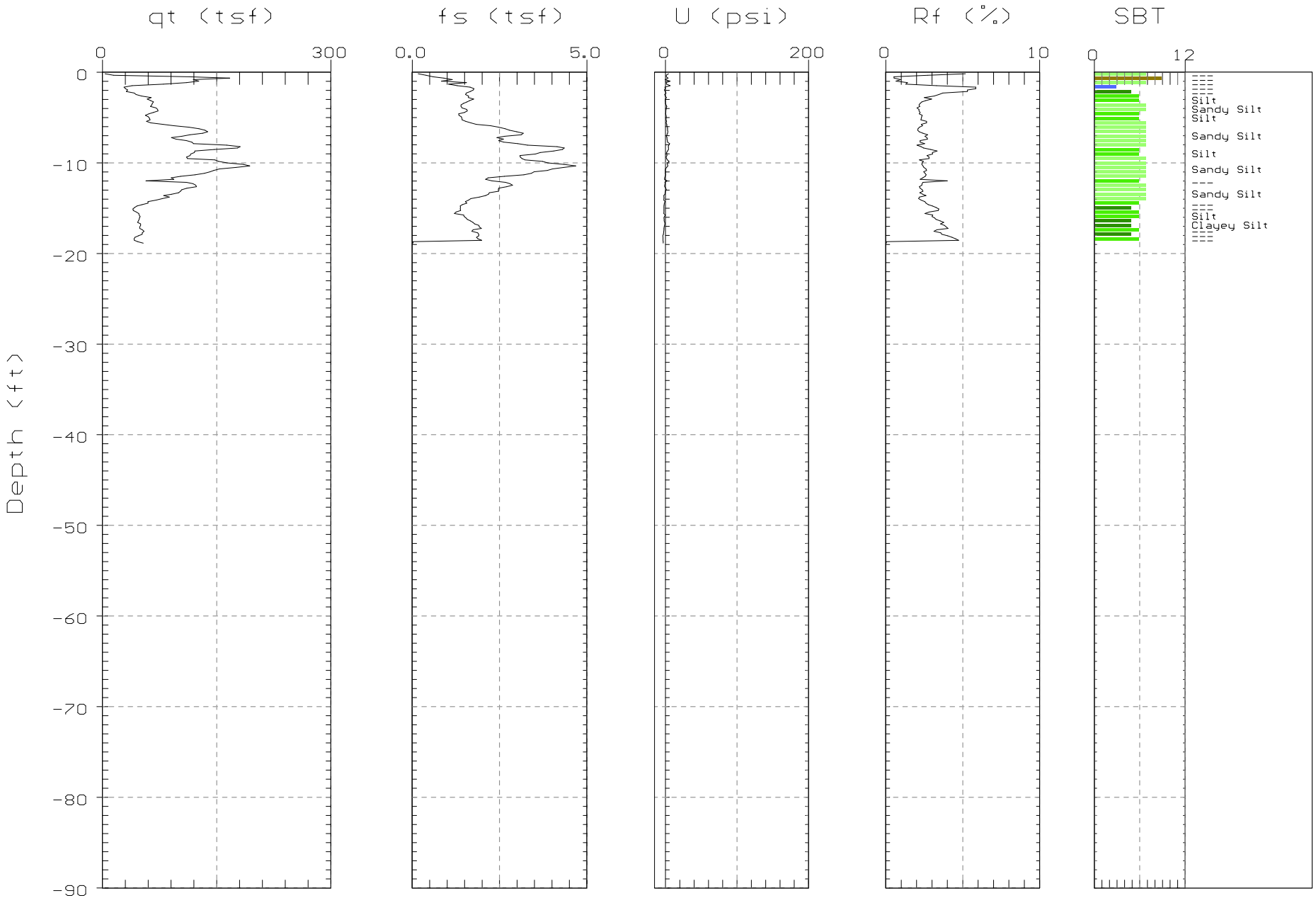
Max. Depth: 34.28 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164174.233E=1847132.668 Engineer: C.SAMS
Location: CPT-1306L=604.3 Date: 05/12/06 09:37



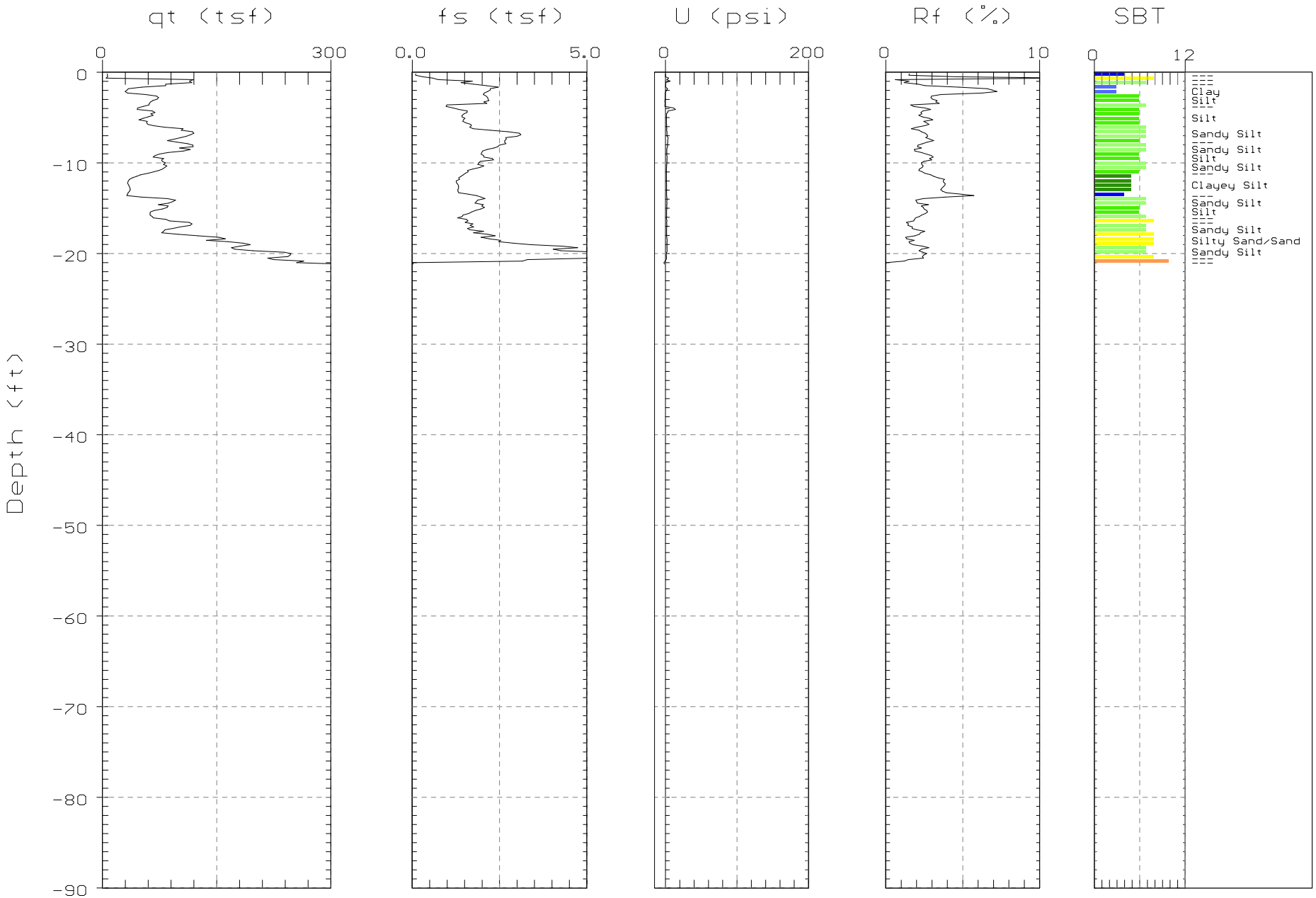
Max. Depth: 18.86 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164172.987E=1847128.893 Engineer: C.SAMS
Location: CPT-1306AL=604.3 Date: 05/12/06 10:09



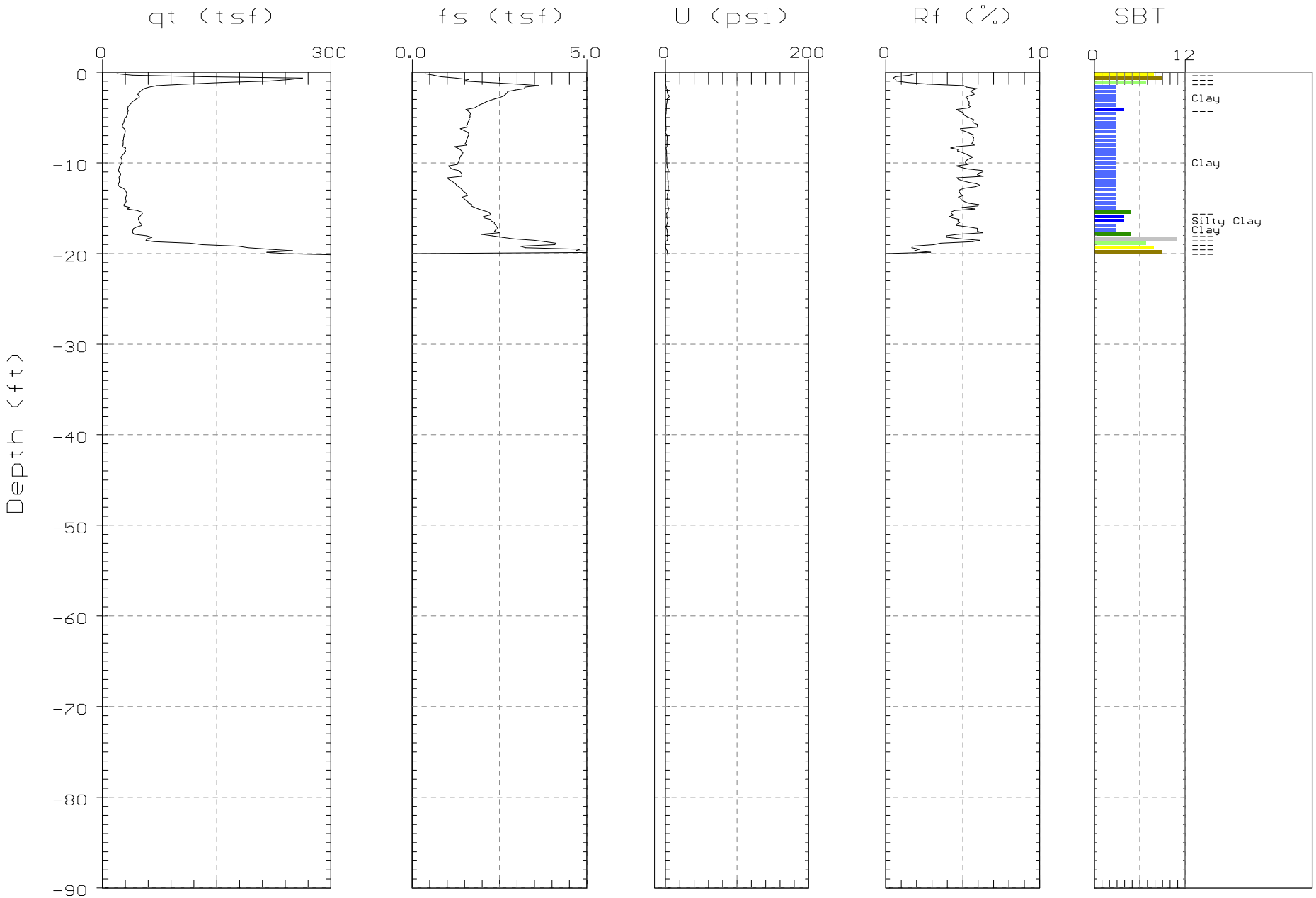
Max. Depth: 21.16 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166393.067E=1847138.502 Engineer: C.SAMS
Location: CPT-1307L=589.8 Date: 05/16/06 08:51



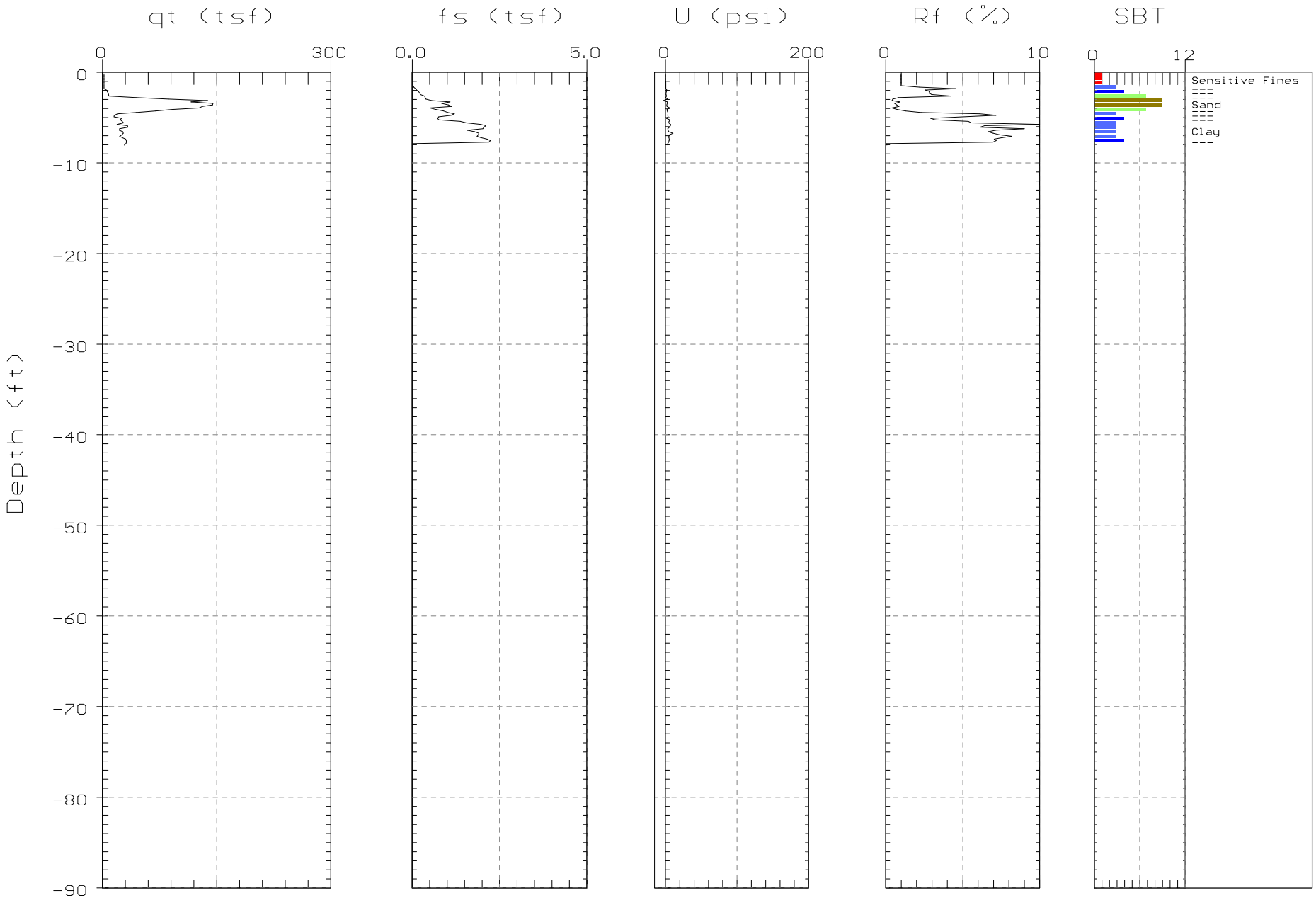
Max. Depth: 20.18 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166994.842E=1844214.37 Engineer: C.SAMS
Location: CPT-1308L=538.0 Date: 05/13/06 11:57



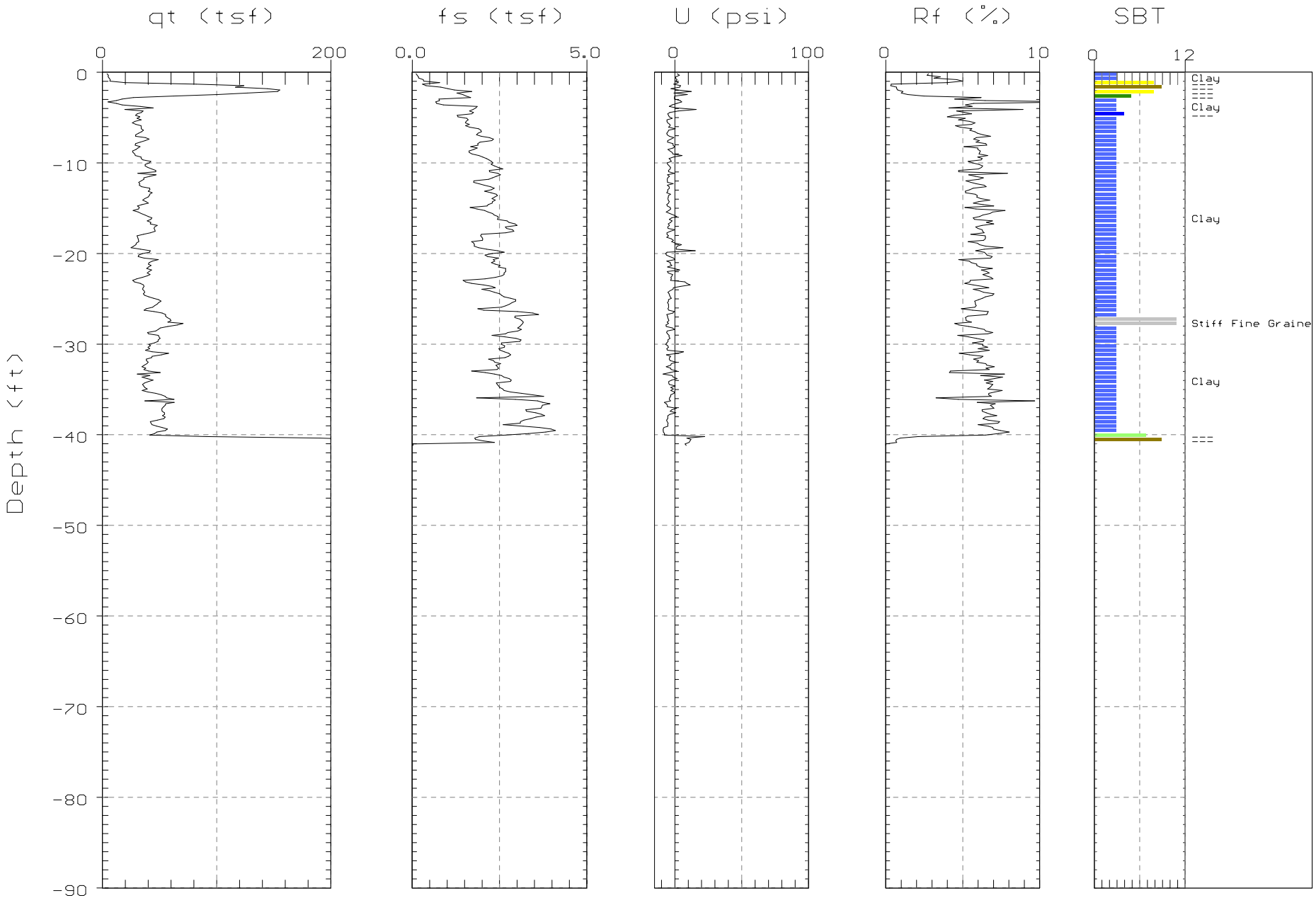
Max. Depth: 8.04 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167001.502E=1844206.906 Engineer: C.SAMS
Location: CPT-1308AL=538.0 Date: 05/14/06 05:56



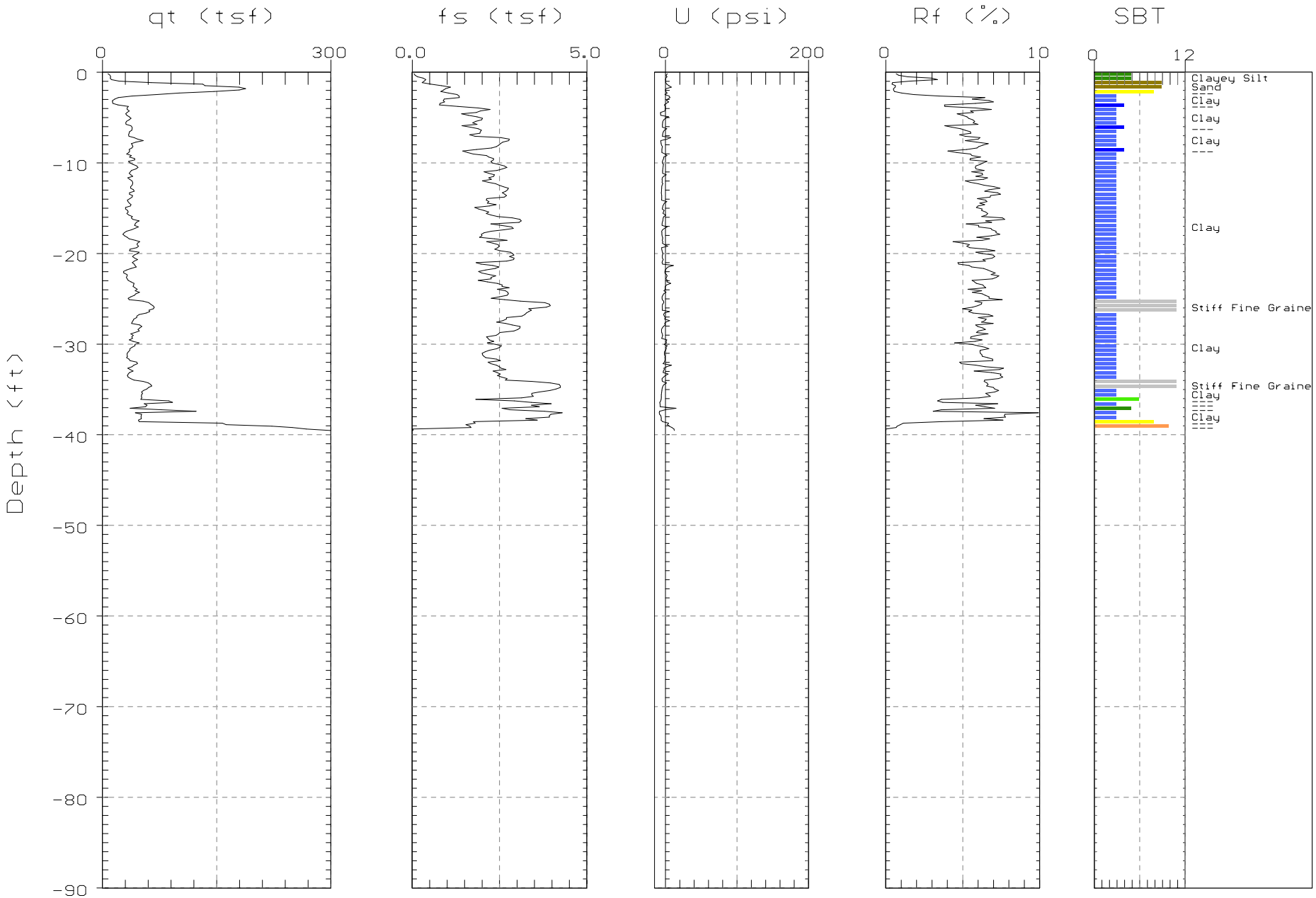
Max. Depth: 41.17 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167008.152E=1844199.436 Engineer: C.SAMS
Location: CPT-1308BL=538.0 Date: 05/16/06 06:35



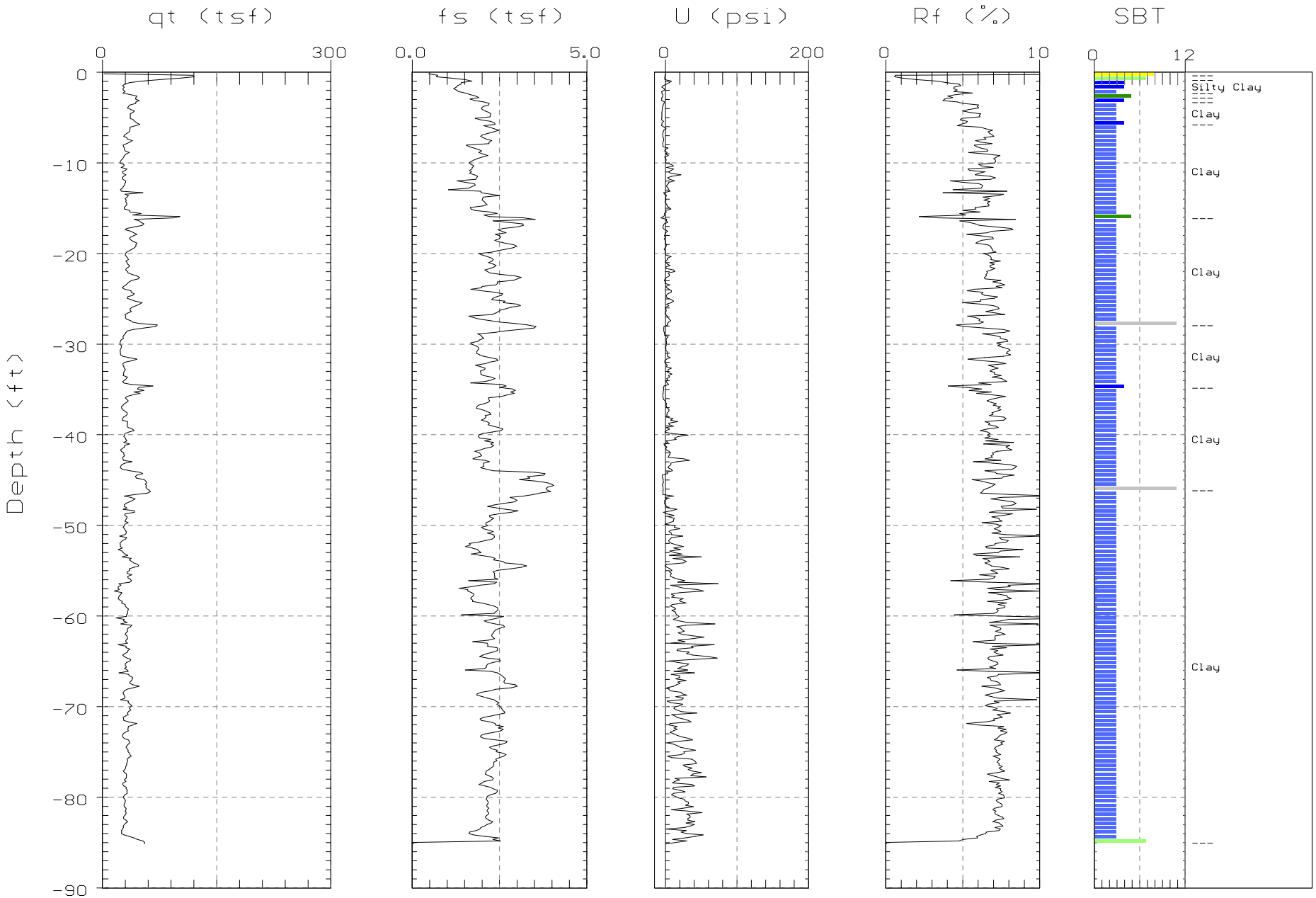
Max. Depth: 39.53 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166860.56E=1844074.211 Engineer: C.SAMS
Location: CPT-1309L=591.0 Date: 05/14/06 10:04



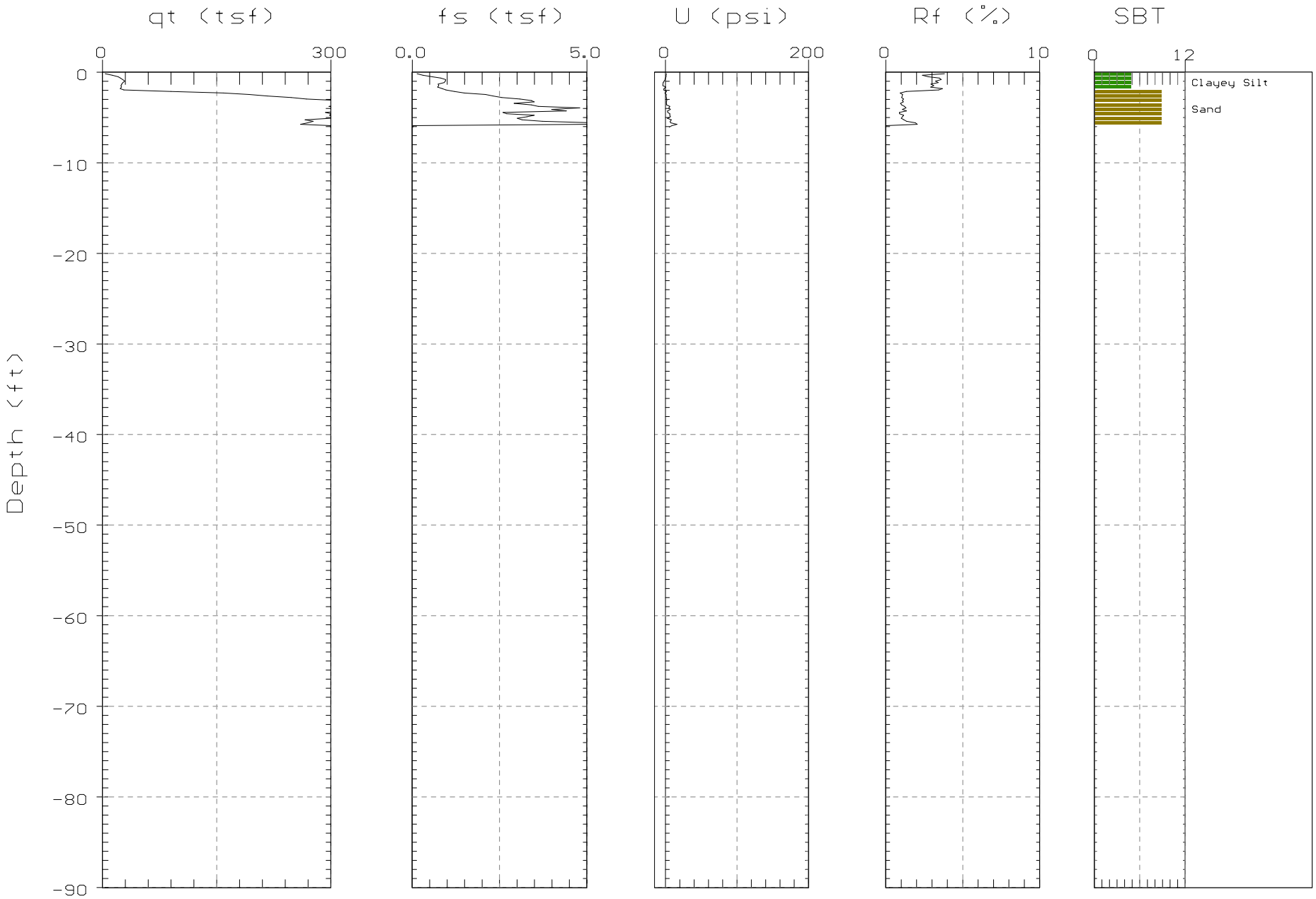
Max. Depth: 85.14 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164932.132E=1846220.577 Engineer: C.SAMS
Location: CPT-1314L=590.0 Date: 05/15/06 13:37



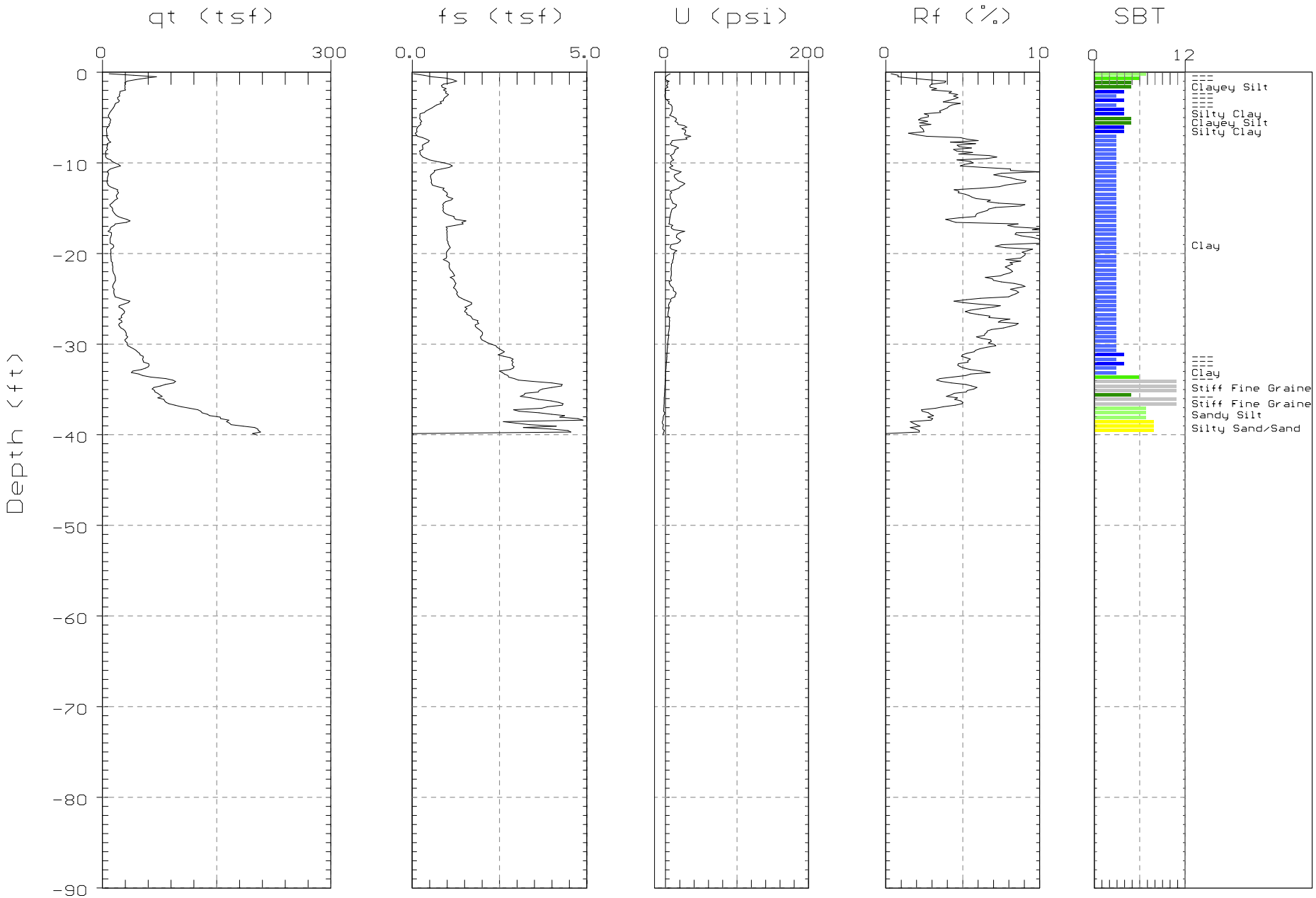
Max. Depth: 6.07 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165032.071E=1846589.827 Engineer: C.SAMS
Location: CPT-1315L=586.9 Date: 05/15/06 12:48



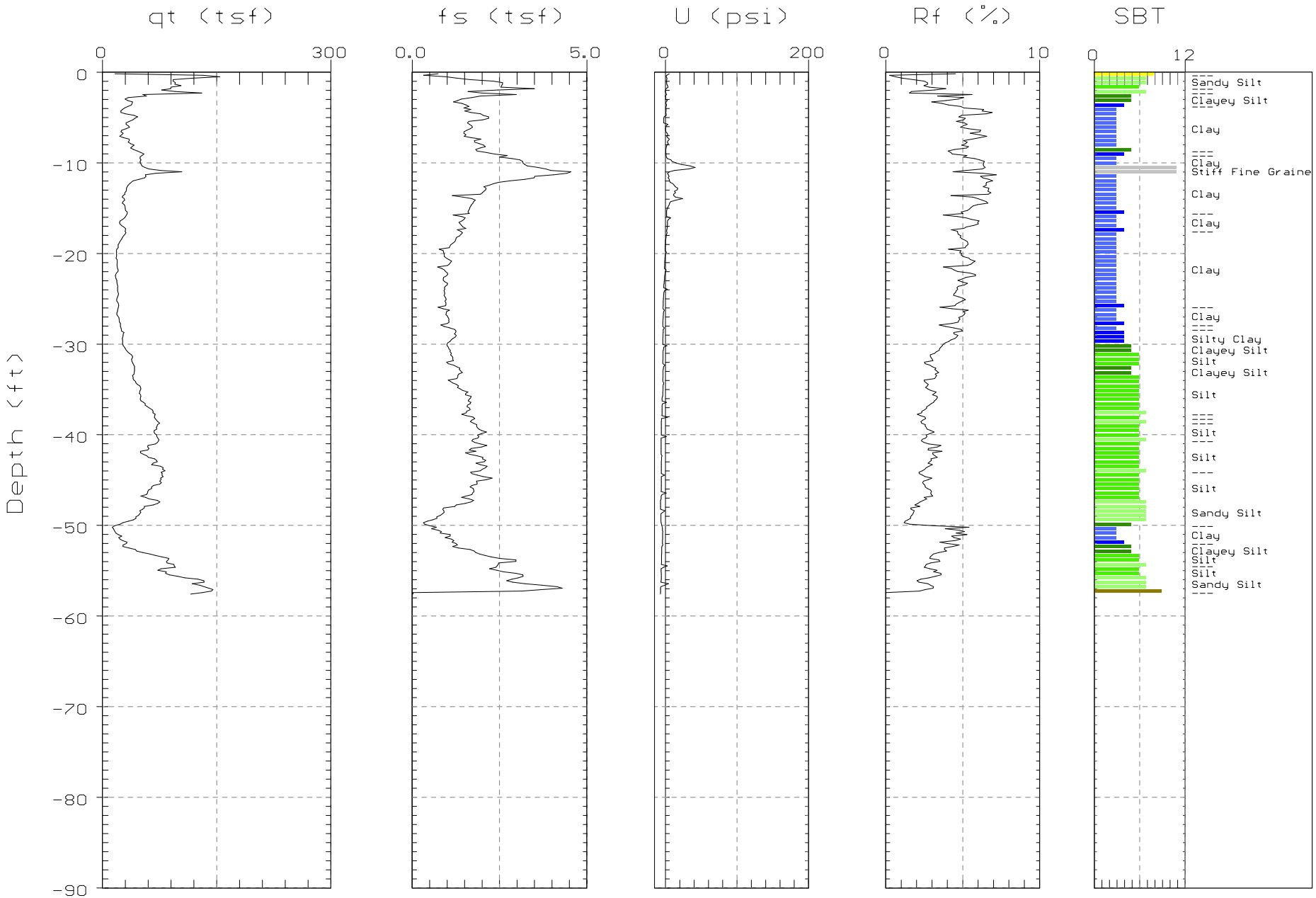
Max. Depth: 40.03 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165442.267E=1847364.975 Engineer: C.SAMS
Location: CPT-1316L=589.6 Date: 05/15/06 11:15



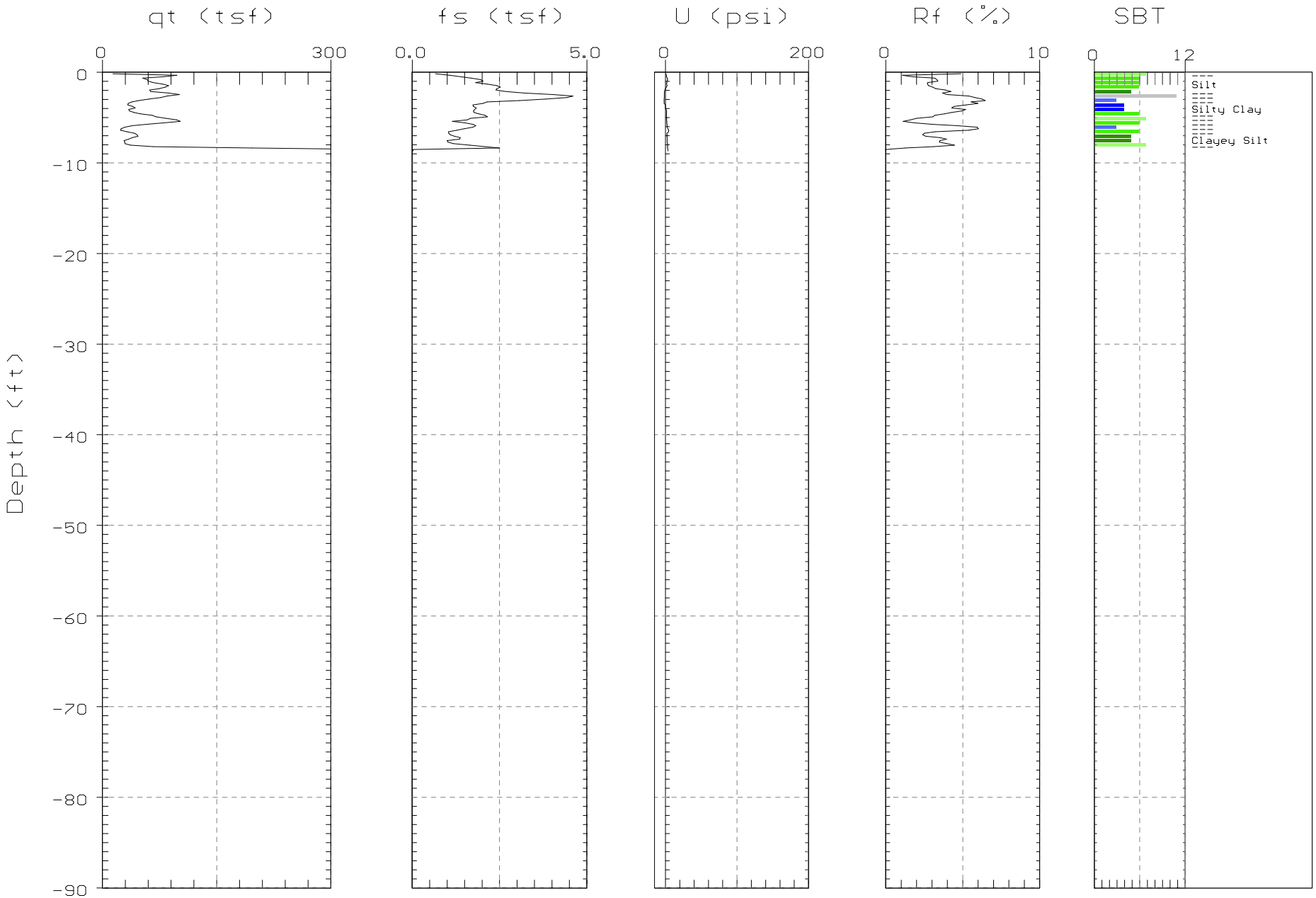
Max. Depth: 57.58 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165480.571E=1847652.112 Engineer: C.SAMS
Location: CPT-1317L=588.7 Date: 05/15/06 10:04



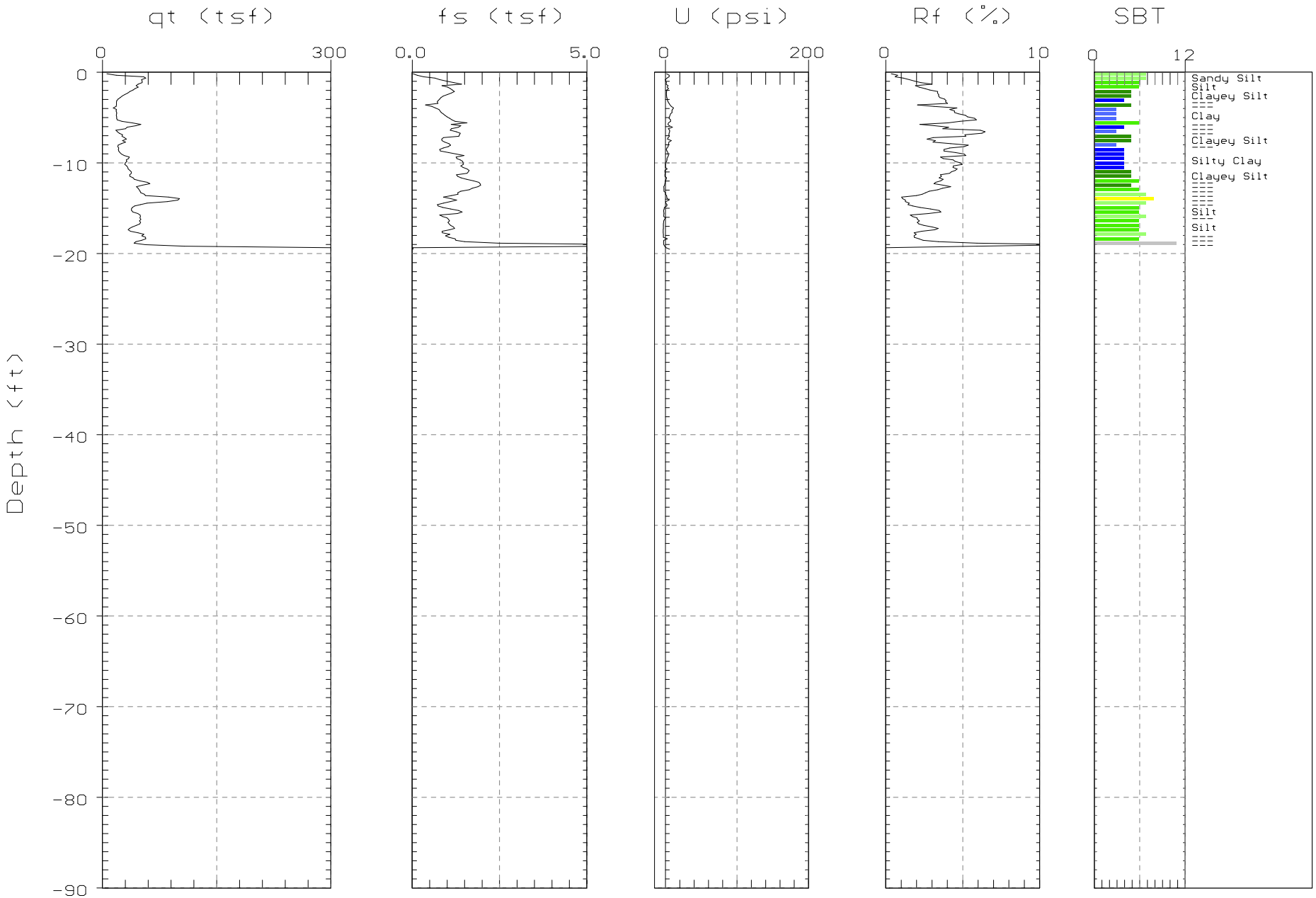
Max. Depth: 8.69 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165481.237E=1847632.773 Engineer: C.SAMS
Location: CPT-1317aL=588.6 Date: 05/15/06 10:36



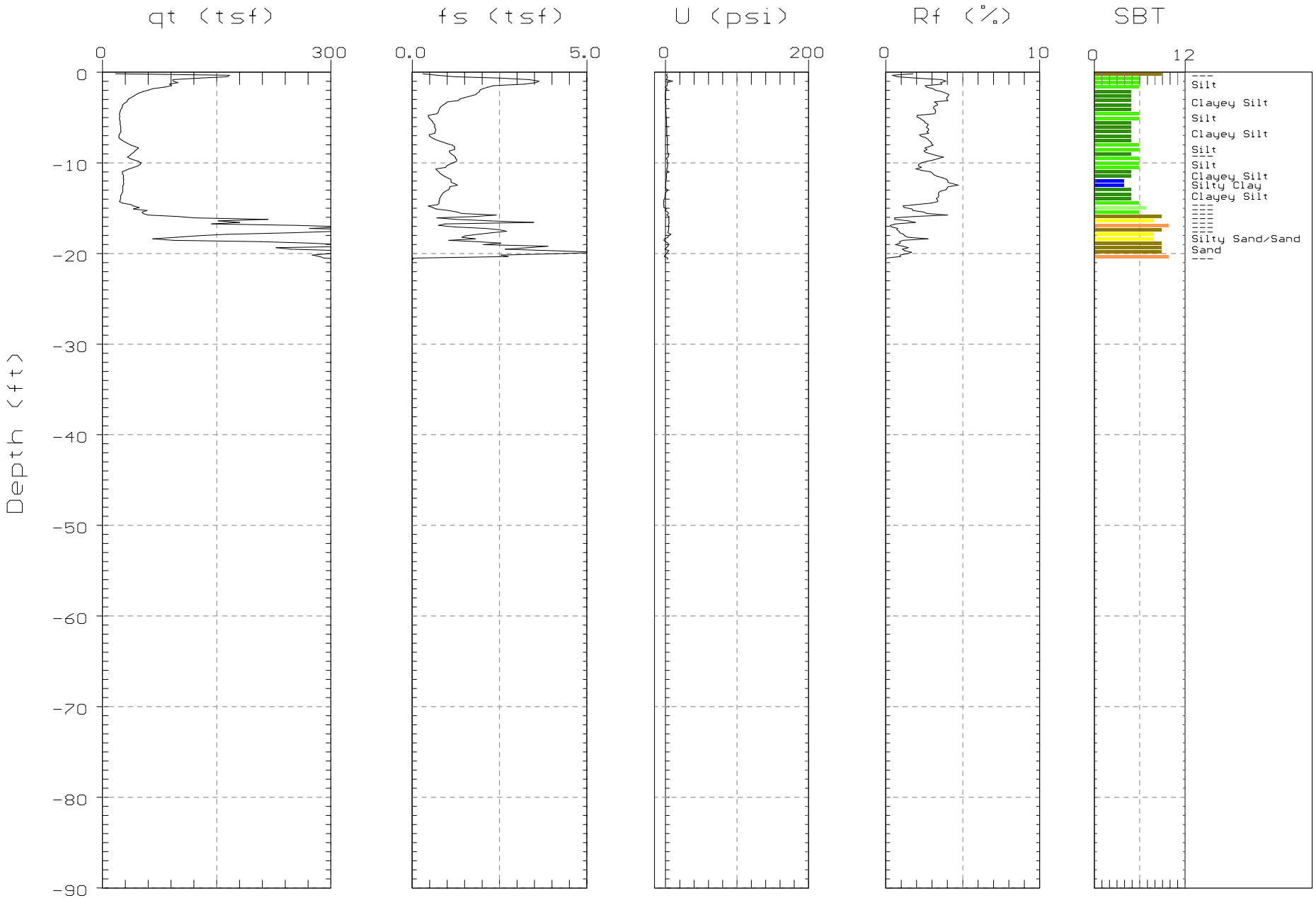
Max. Depth: 19.52 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165497.097E=1847636.907 Engineer: C.SAMS
Location: CPT-1317bL=588.8 Date: 05/16/06 09:30



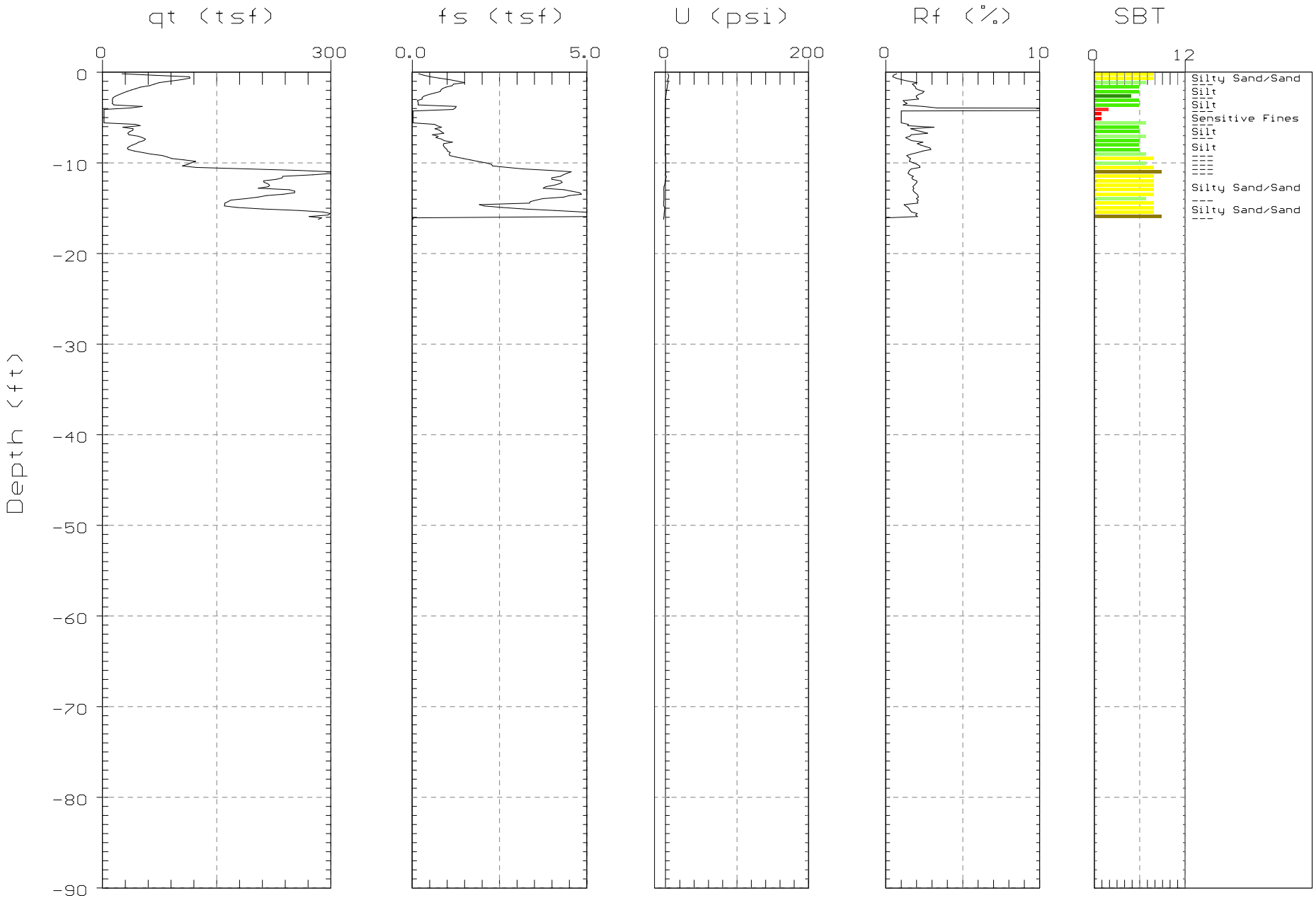
Max. Depth: 20.67 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167614.444E=1847587.31 Engineer: C.SAMS
Location: CPT-1318L=586.4 Date: 05/15/06 08:10



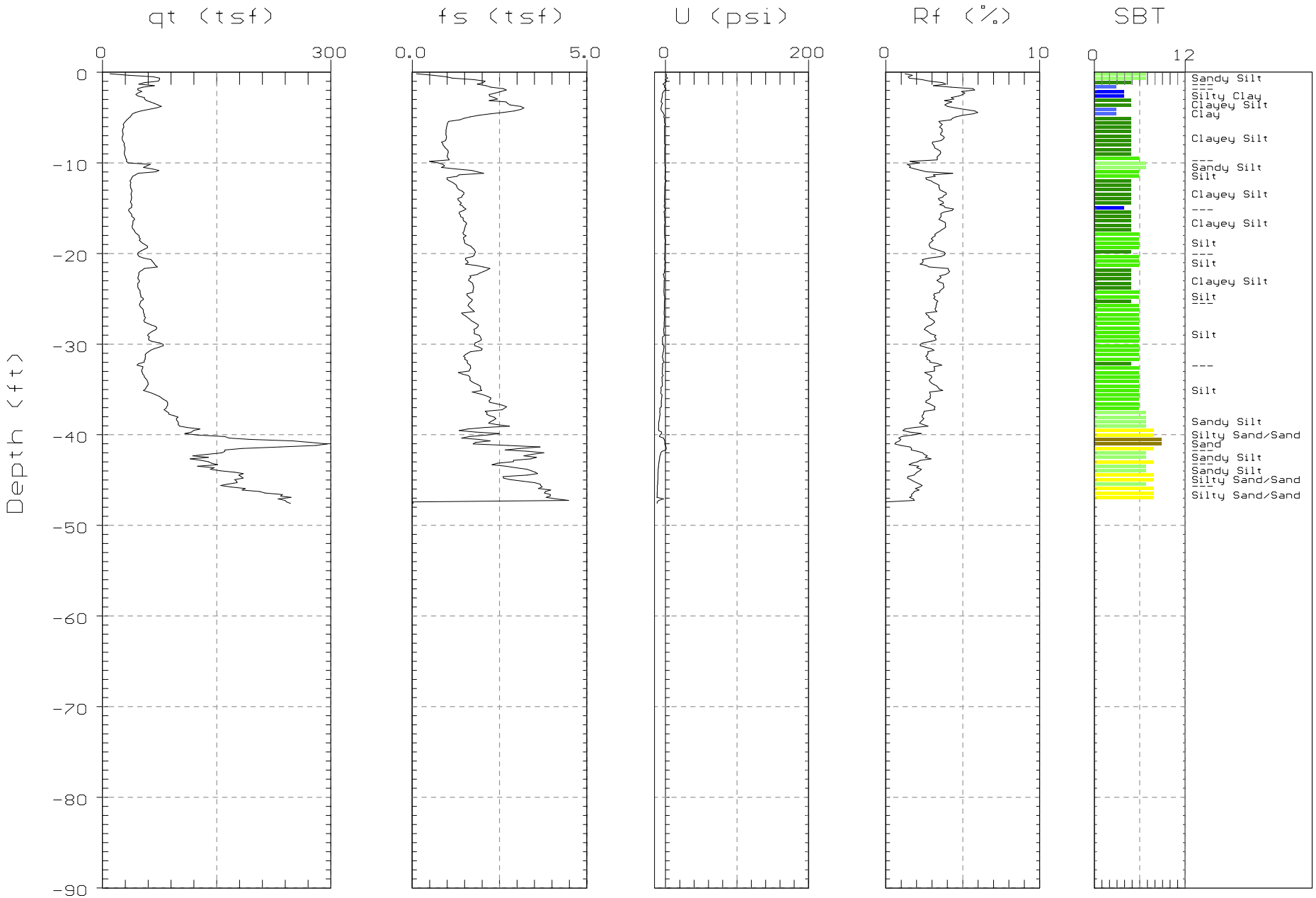
Max. Depth: 16.24 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167695.014E=1847778.705 Engineer: C.SAMS
Location: CPT-1319L=587.9 Date: 05/15/06 05:50



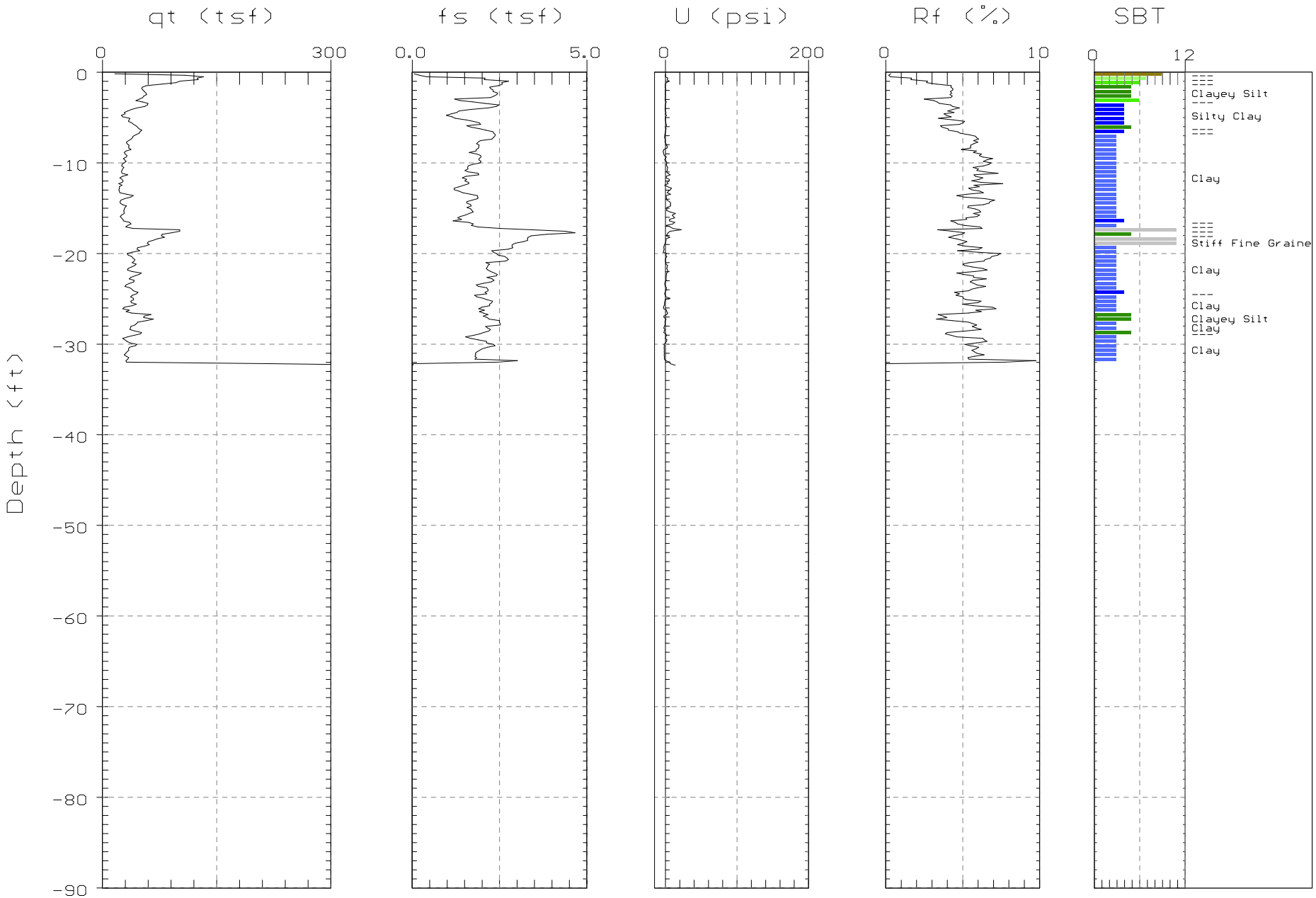
Max. Depth: 47.57 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164809.635E=1847497.262 Engineer: C.SAMS
Location: CPT-1320L=604.9 Date: 08/20/06 08:56



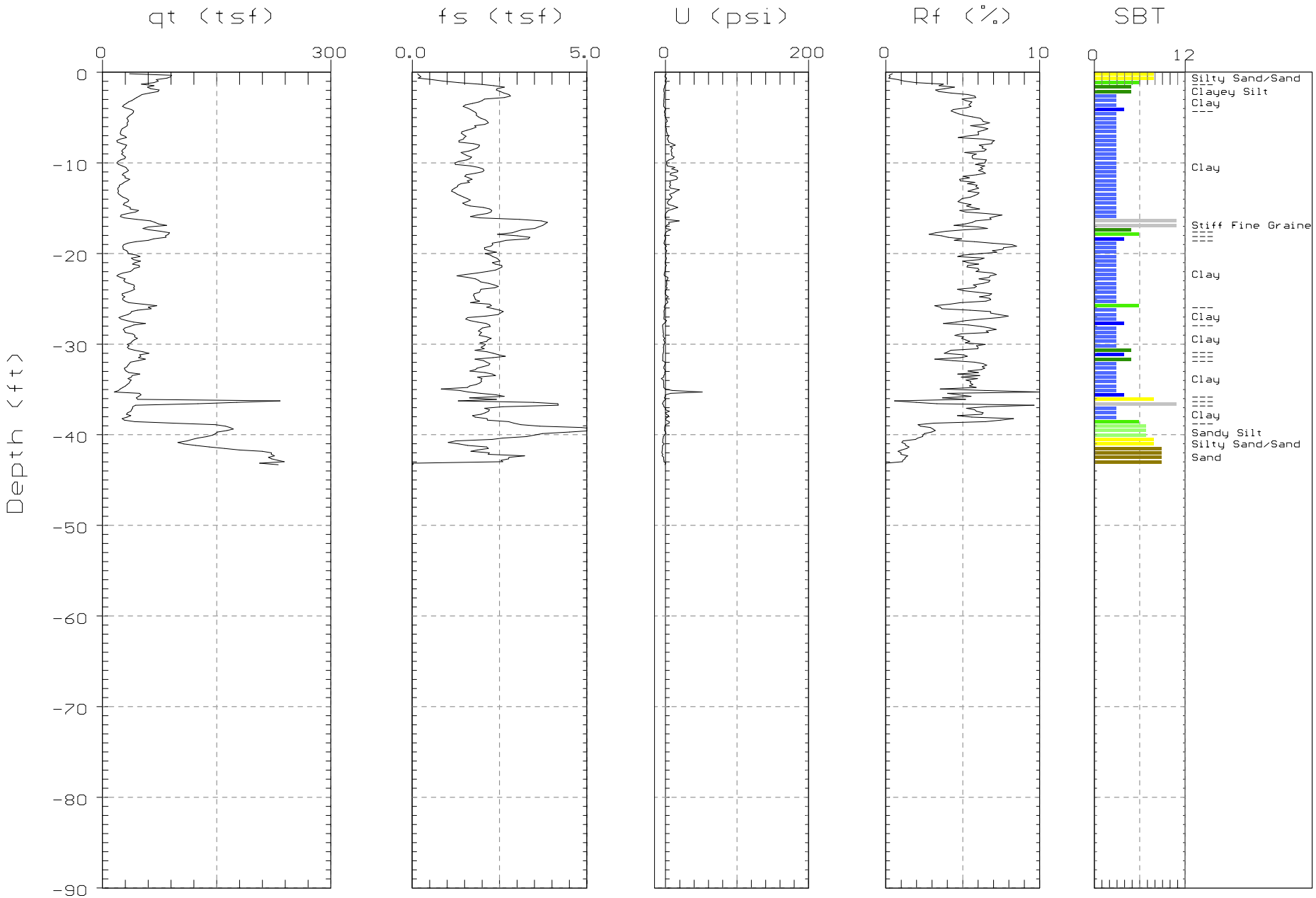
Max. Depth: 32.32 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164802.258E=1847460.695 Engineer: C.SAMS
Location: CPT-1321L=604.9 Date: 08/20/06 10:17



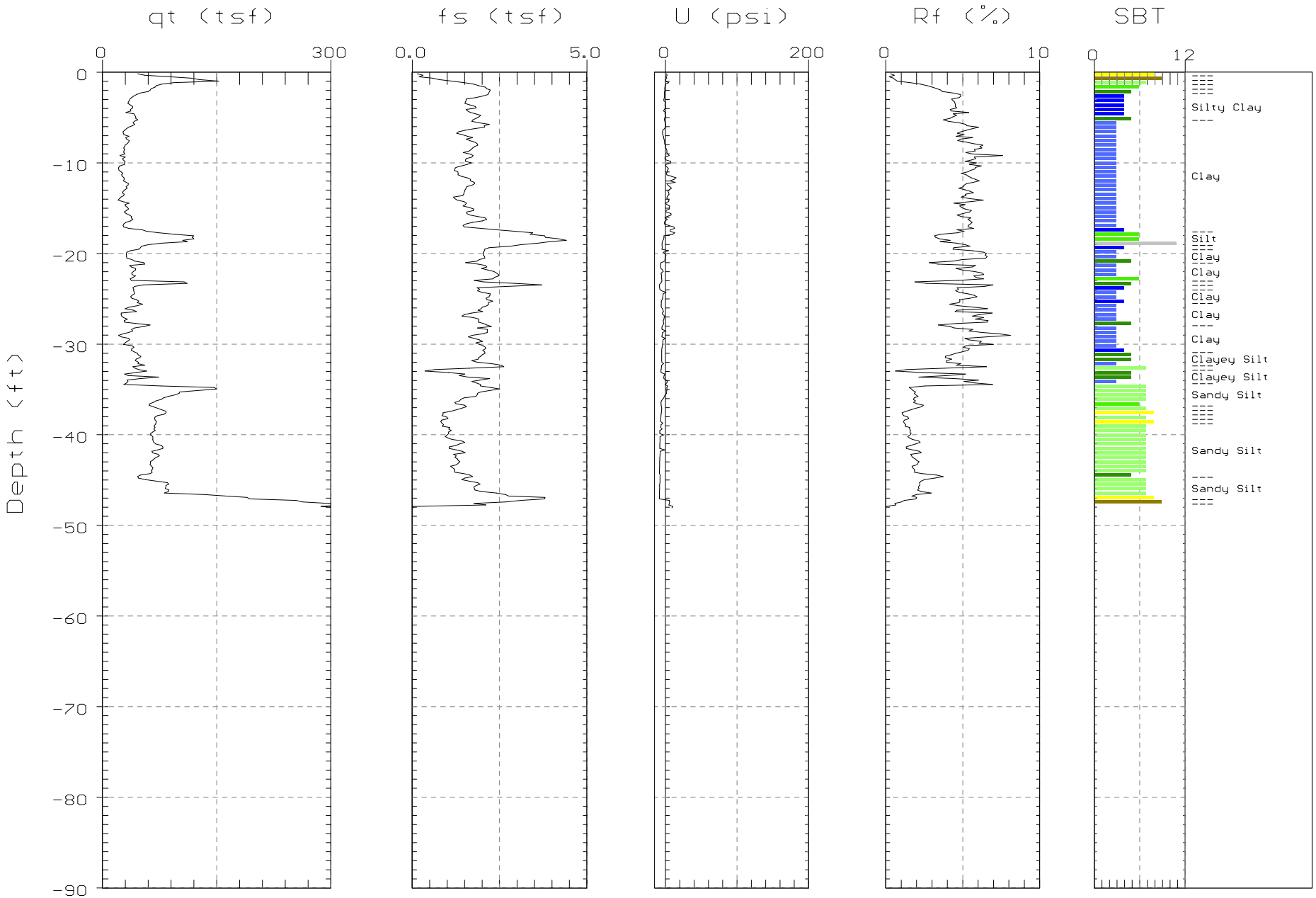
Max. Depth: 43.31 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164794.98E=1847472.657 Engineer: C.SAMS
Location: CPT-1322L=605.2 Date: 08/20/06 07:01



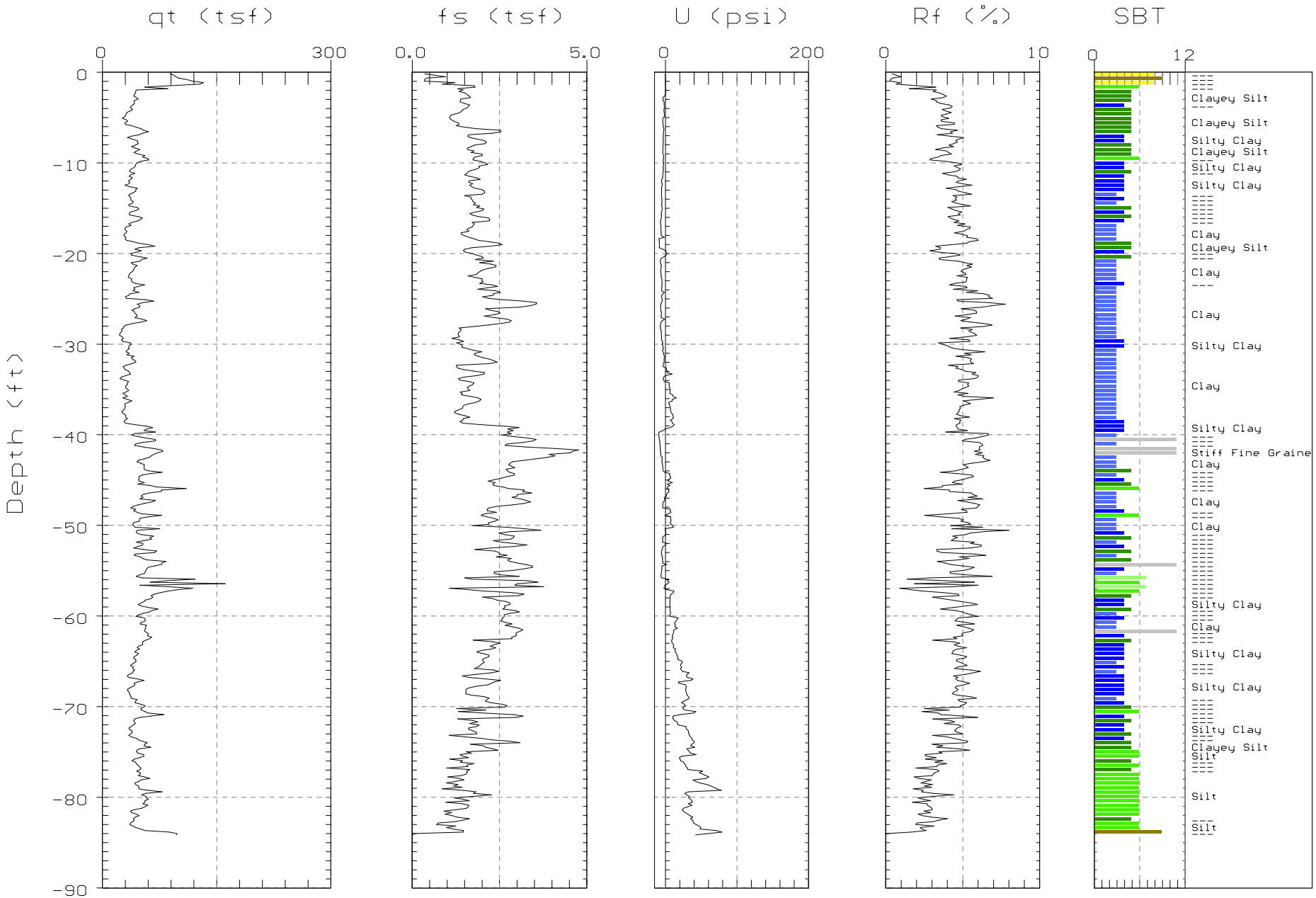
Max. Depth: 48.06 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165679.211E=1848305.418 Engineer: C.SAMS
Location: CPT-1323L=610.5 Date: 08/19/06 05:19



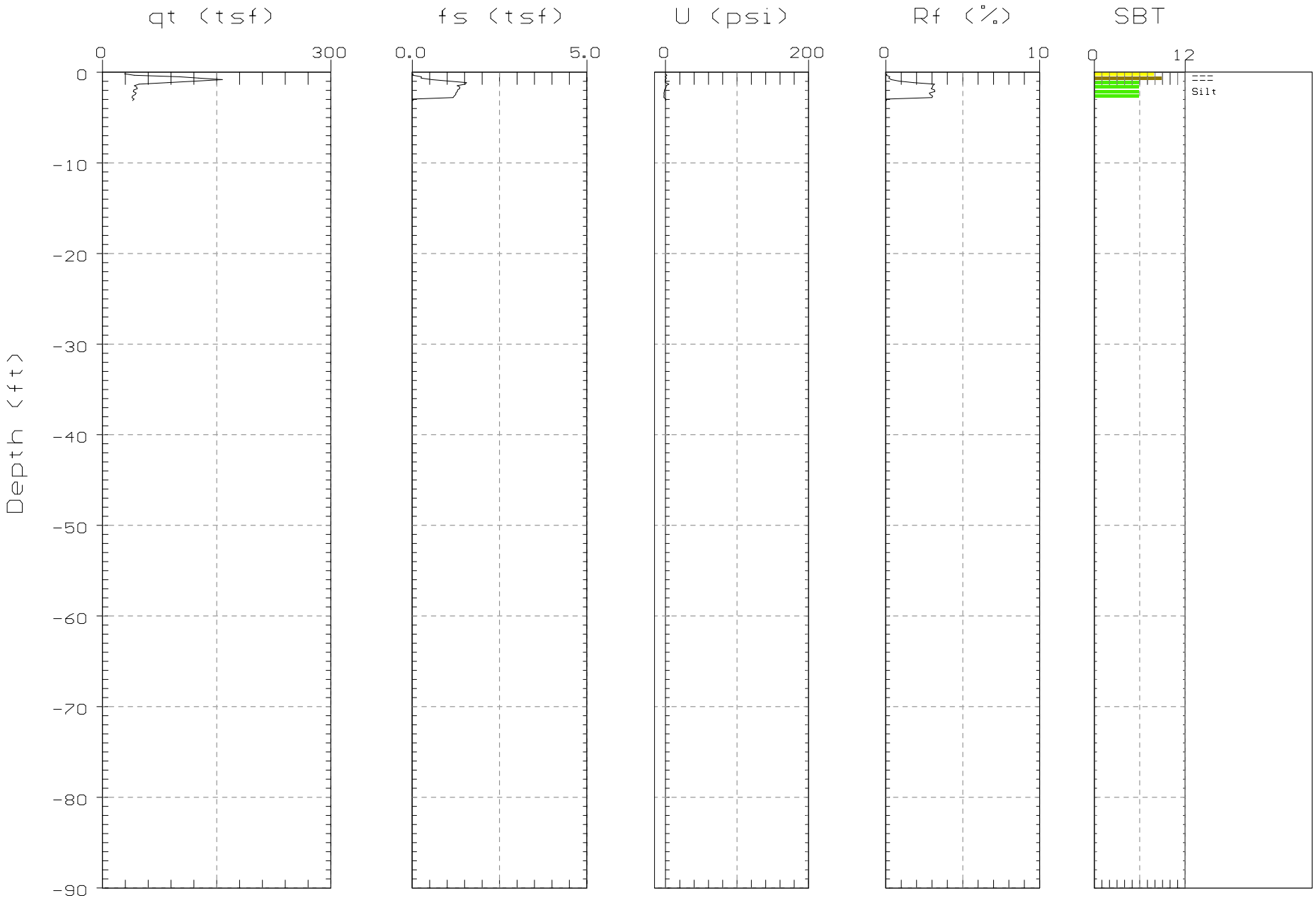
Max. Depth: 84.15 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165733.296E=1848334.24 Engineer: C.SAMS
Location: CPT-1324L=610.2 Date: 08/19/06 08:43



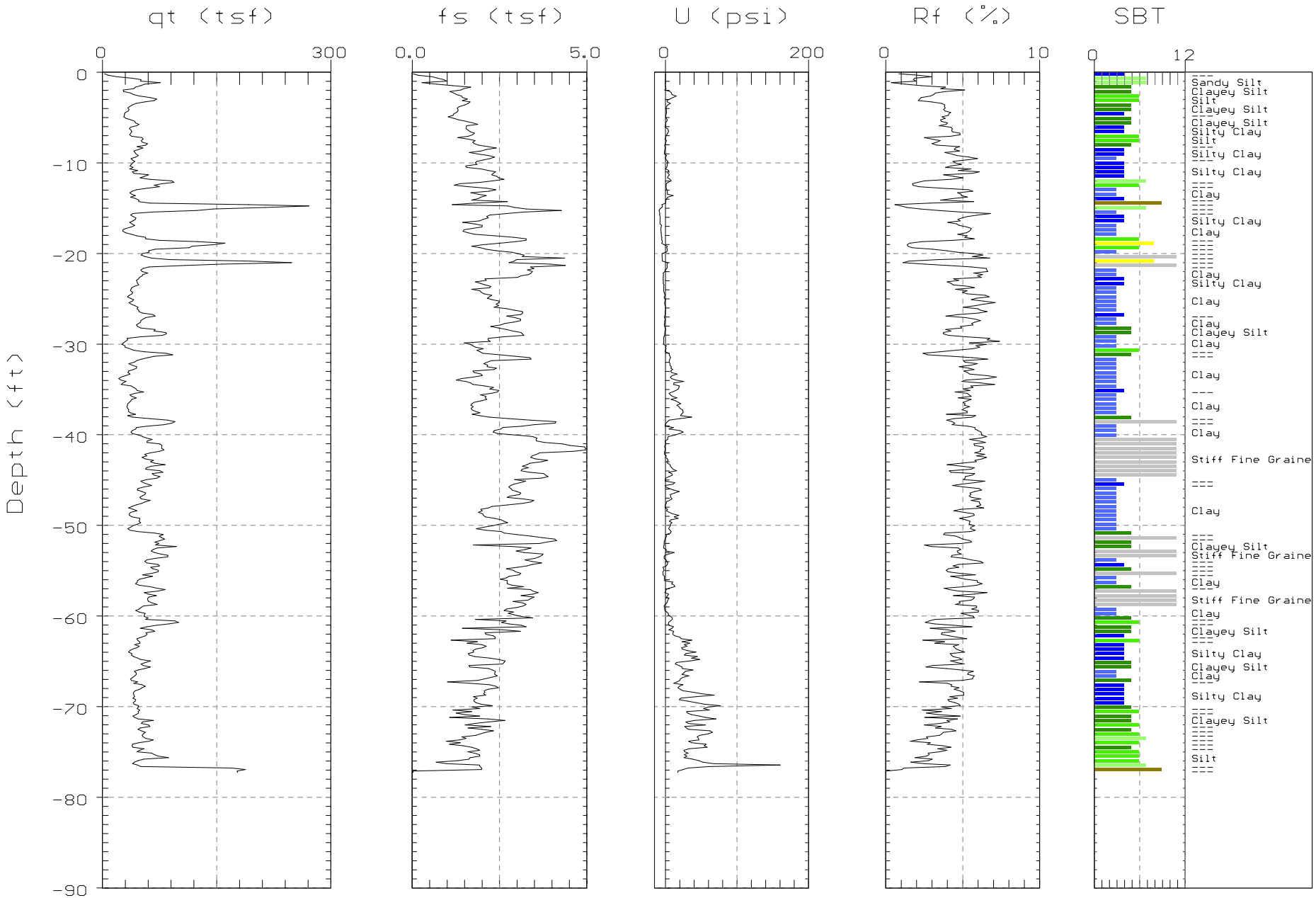
Max. Depth: 3.12 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165733.296E=1848334.24 Engineer: C.SAMS
Location: CPT-1324BL=610.2 Date: 08/19/06 09:02



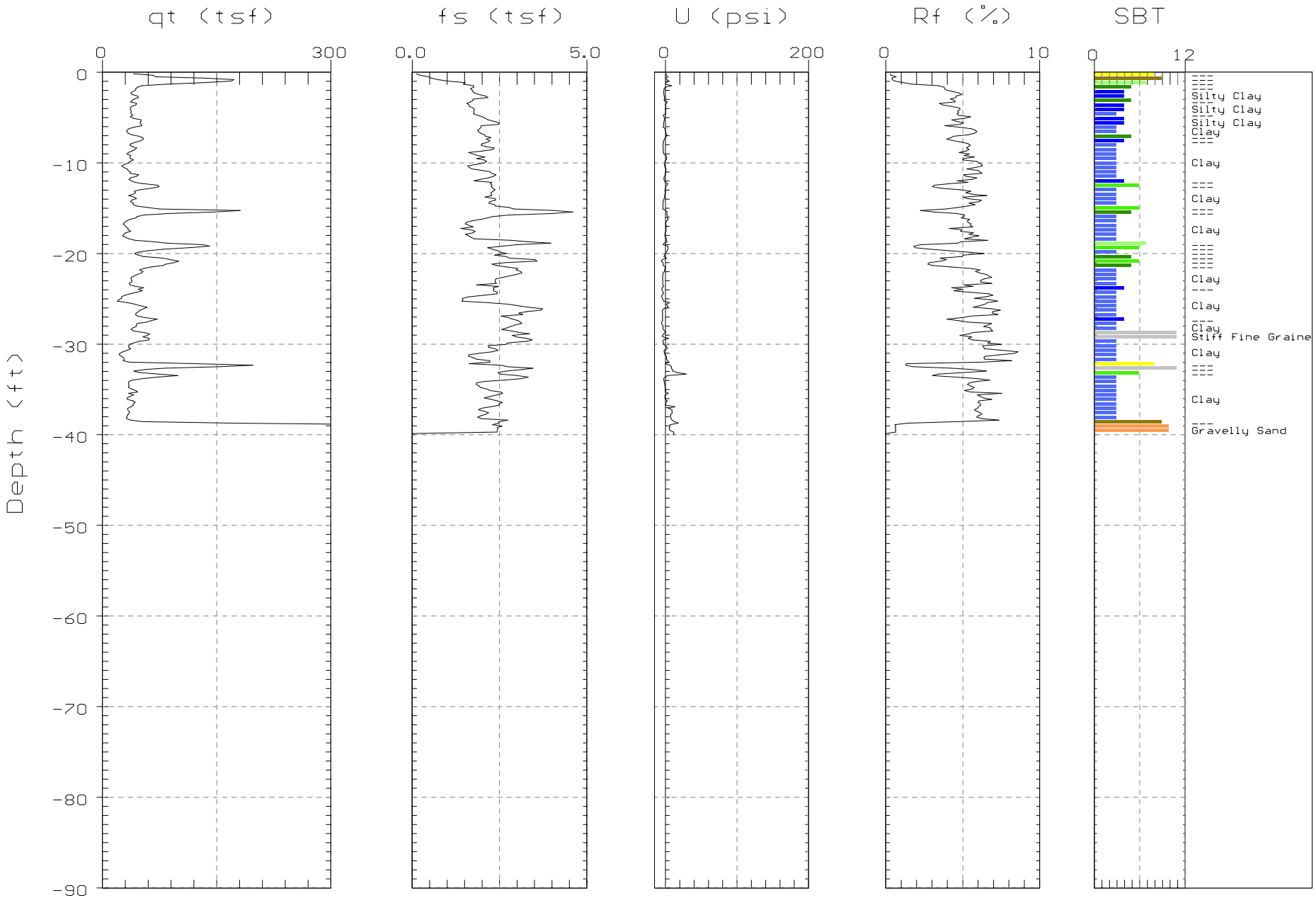
Max. Depth: 77.26 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165730.729E=1848273.937 Engineer: C.SAMS
Location: CPT-1325L=610.3 Date: 08/19/06 11:35



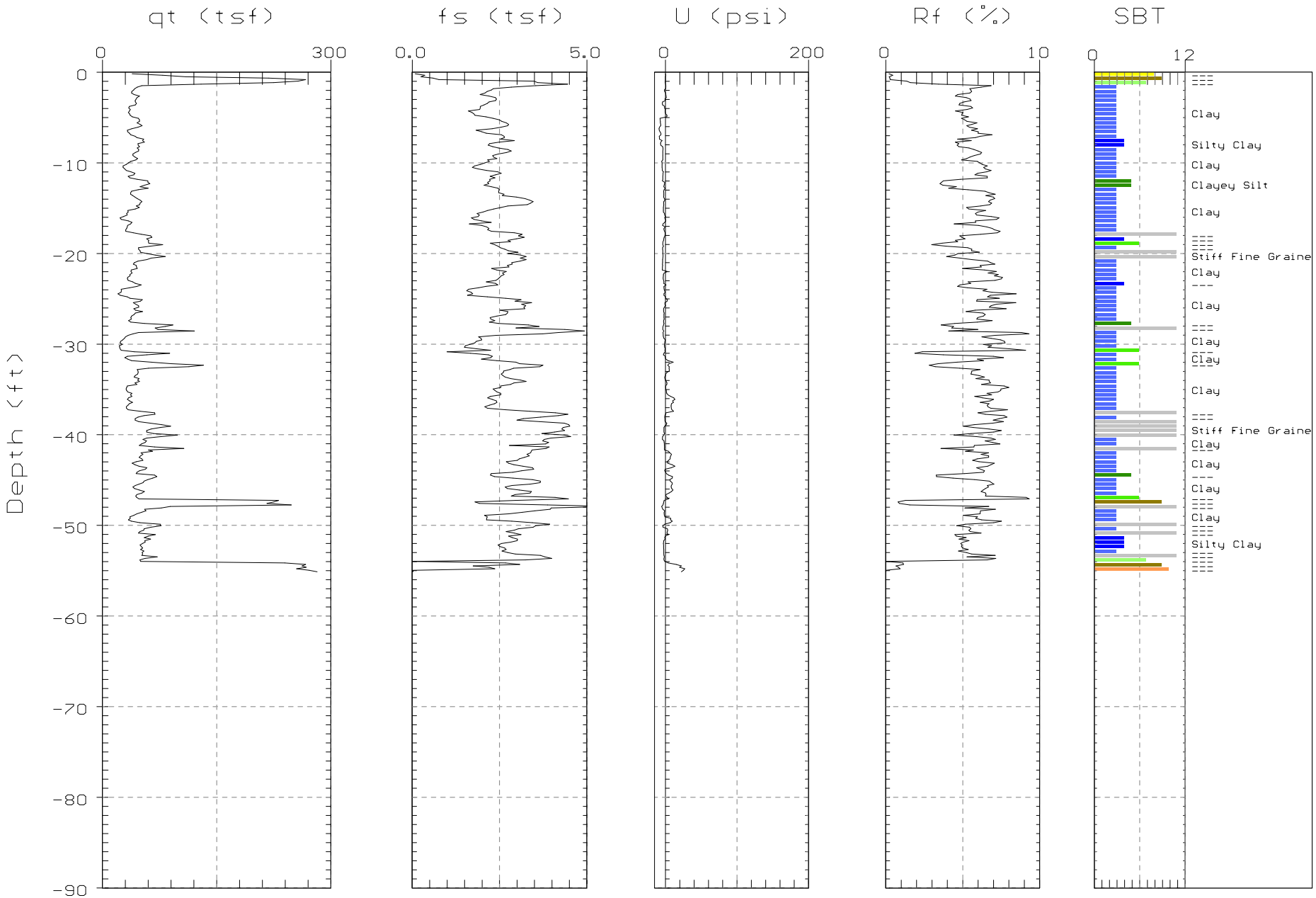
Max. Depth: 40.03 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165728.968E=1848272.952 Engineer: C.SAMS
Location: CPT-1325AL=610.1 Date: 08/19/06 12:39



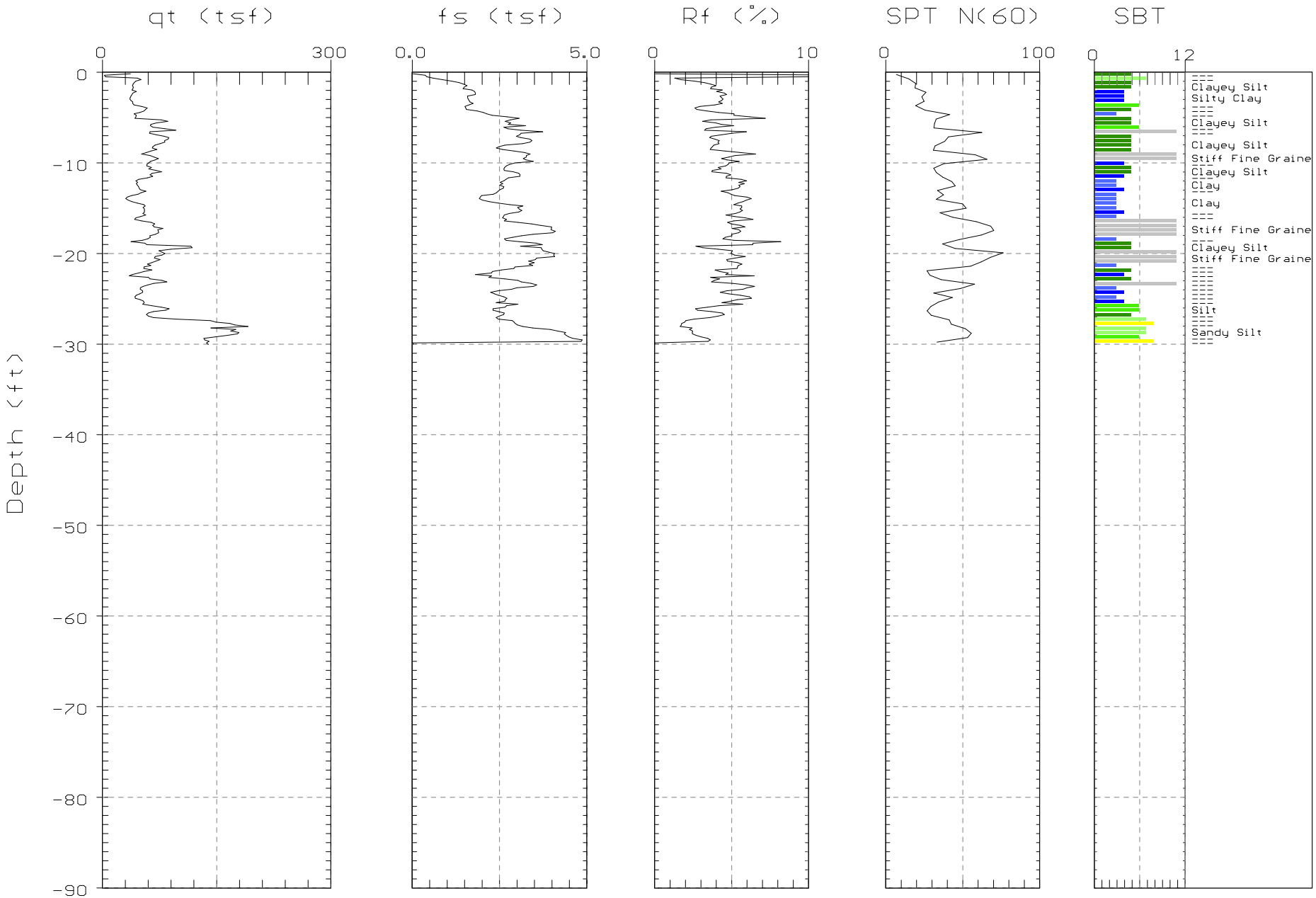
Max. Depth: 55.12 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165285.875E=1845003.07 Engineer: C.SAMS
Location: CPT-1300L=609.2 Date: 05:12:06 06:35



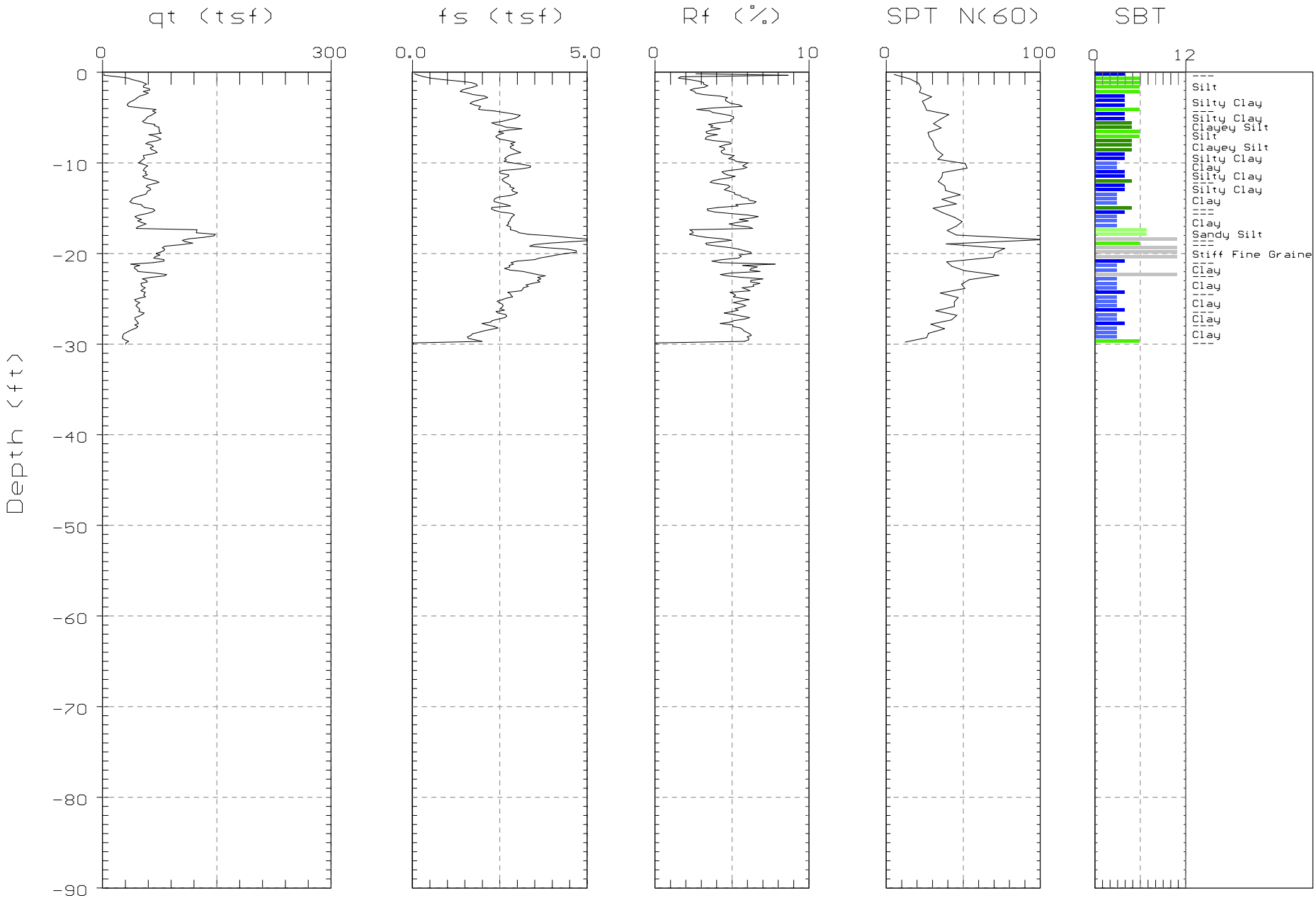
Max. Depth: 30.02 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164894.228E=1845085.762 Engineer: C.SAMS
Location: CPT-1301L=609.8 Date: 05/11/06 14:37



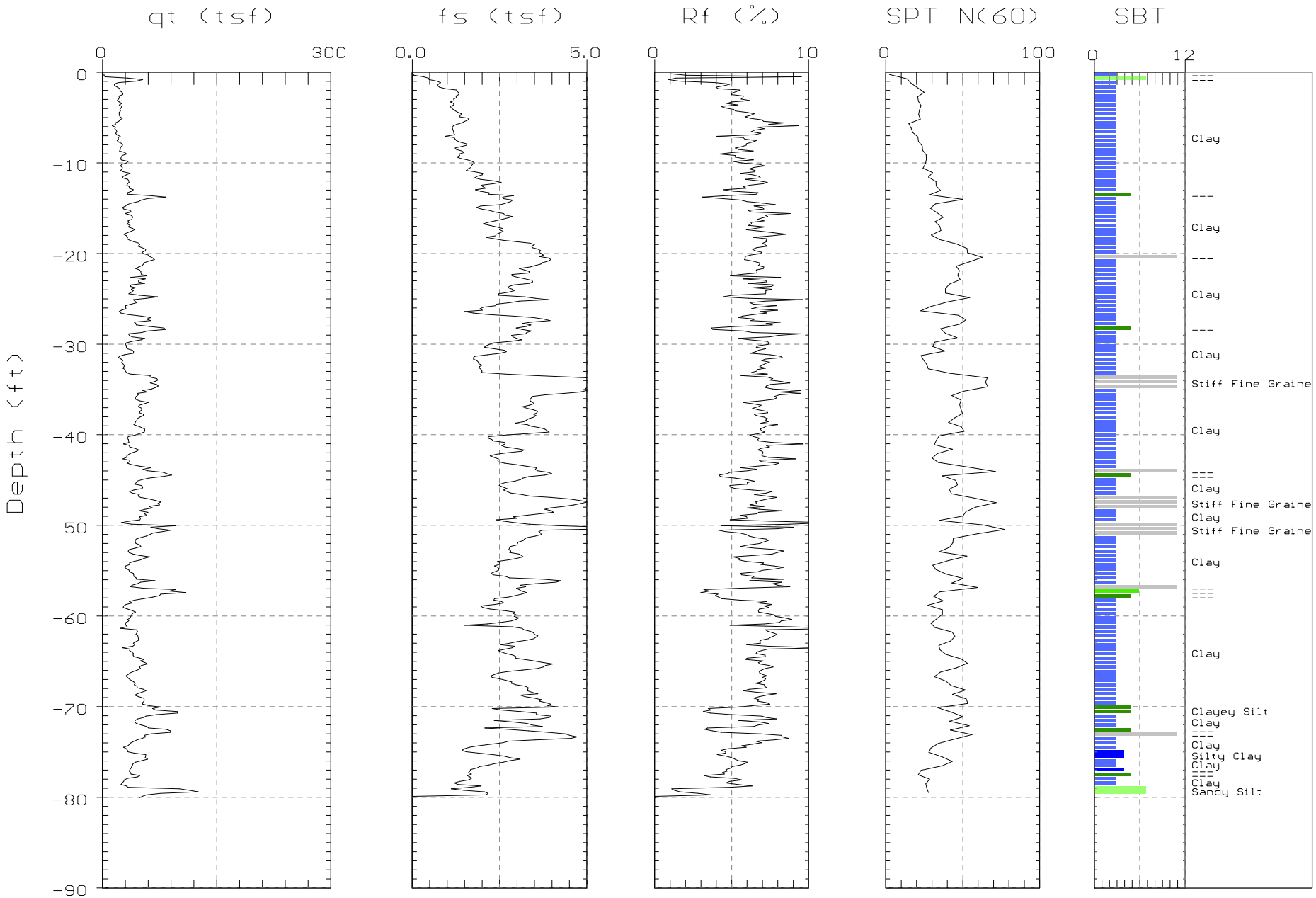
Max. Depth: 30.02 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166124.625E=1848040.224 Engineer: C.SAMS
Location: CPT-1302L=609.3 Date: 05/12/06 11:13



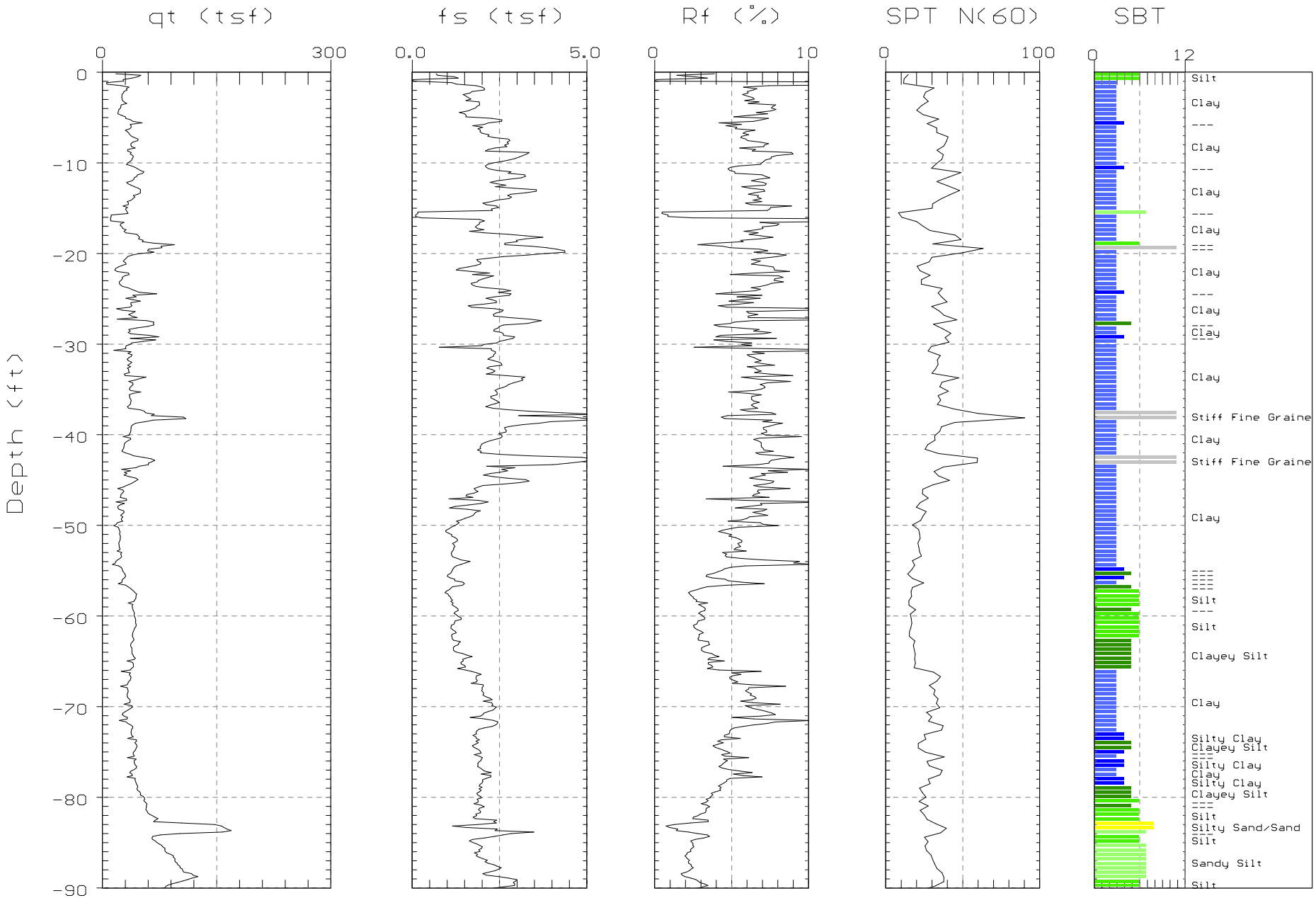
Max. Depth: 80.05 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165582.495E=1848103.244 Engineer: C.SAMS
Location: CPT-1303L=609.6 Date: 05/13/06 08:30



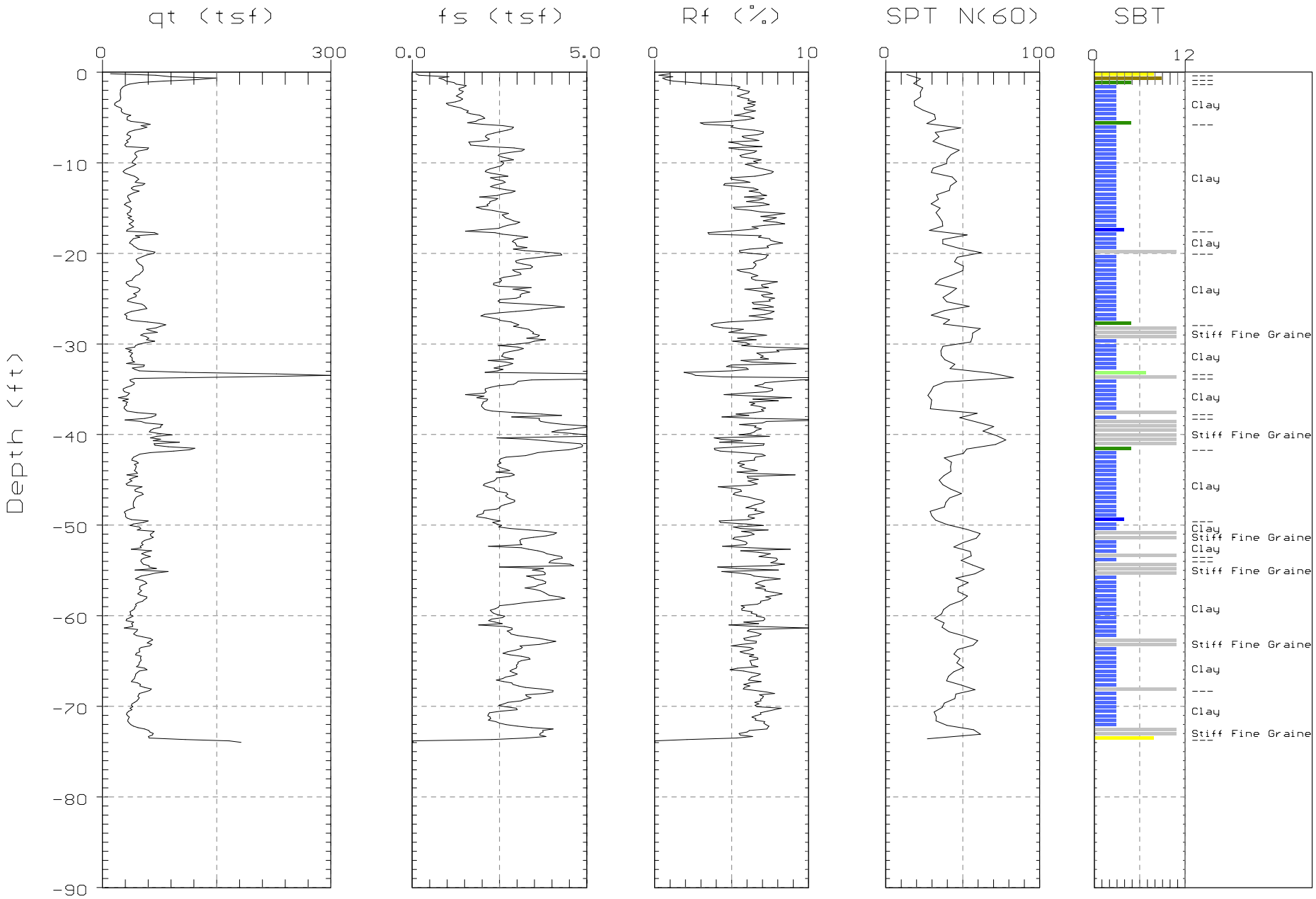
Max. Depth: 90.55 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165892.587E=1848181.888 Engineer: C.SAMS
Location: CPT-1304L=609.8 Date: 05/12/06 13:23



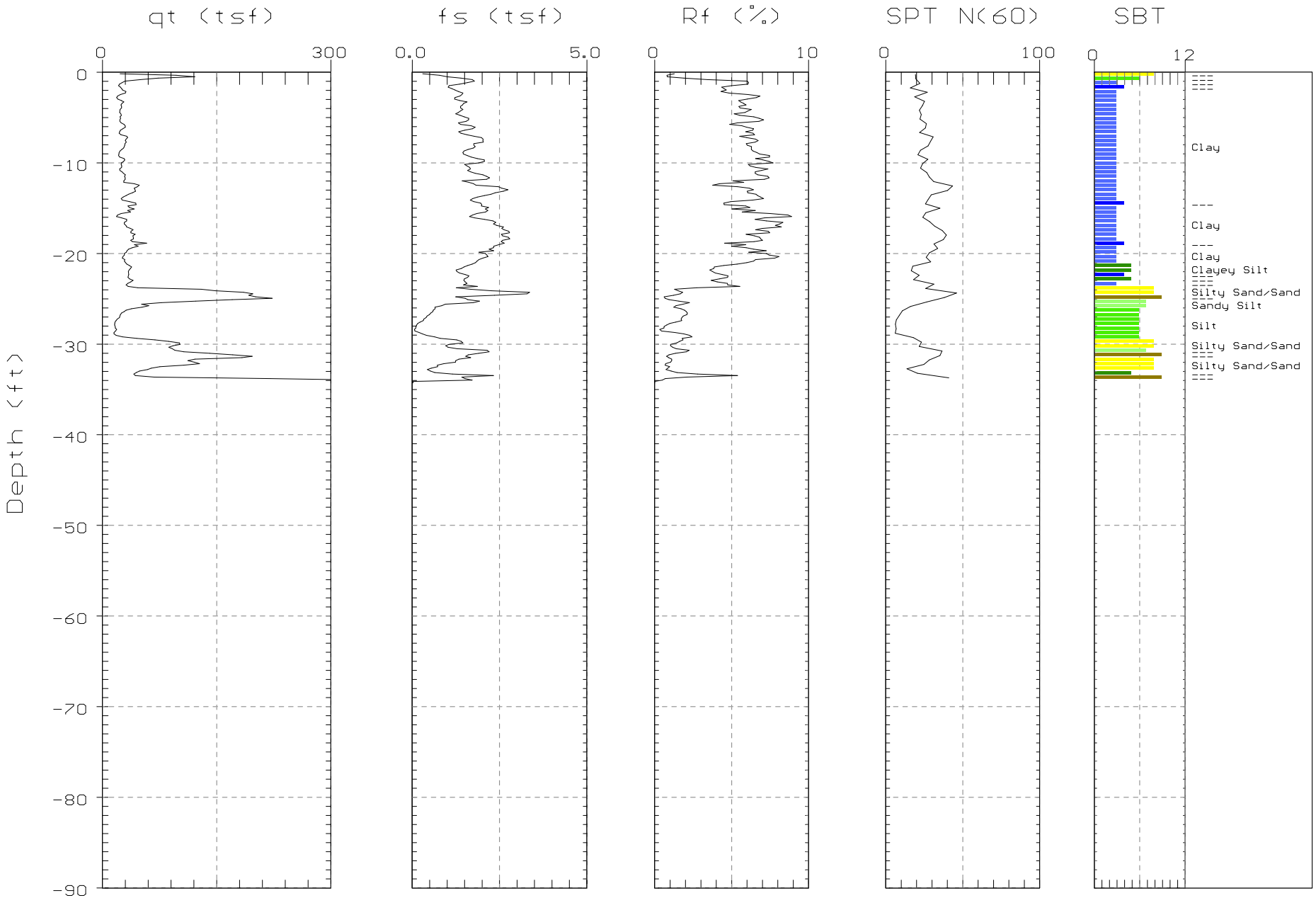
Max. Depth: 73.98 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164732.401E=1847452.326 Engineer: C.SAMS
Location: CPT-1305L=603.7 Date: 05/12/06 08:29



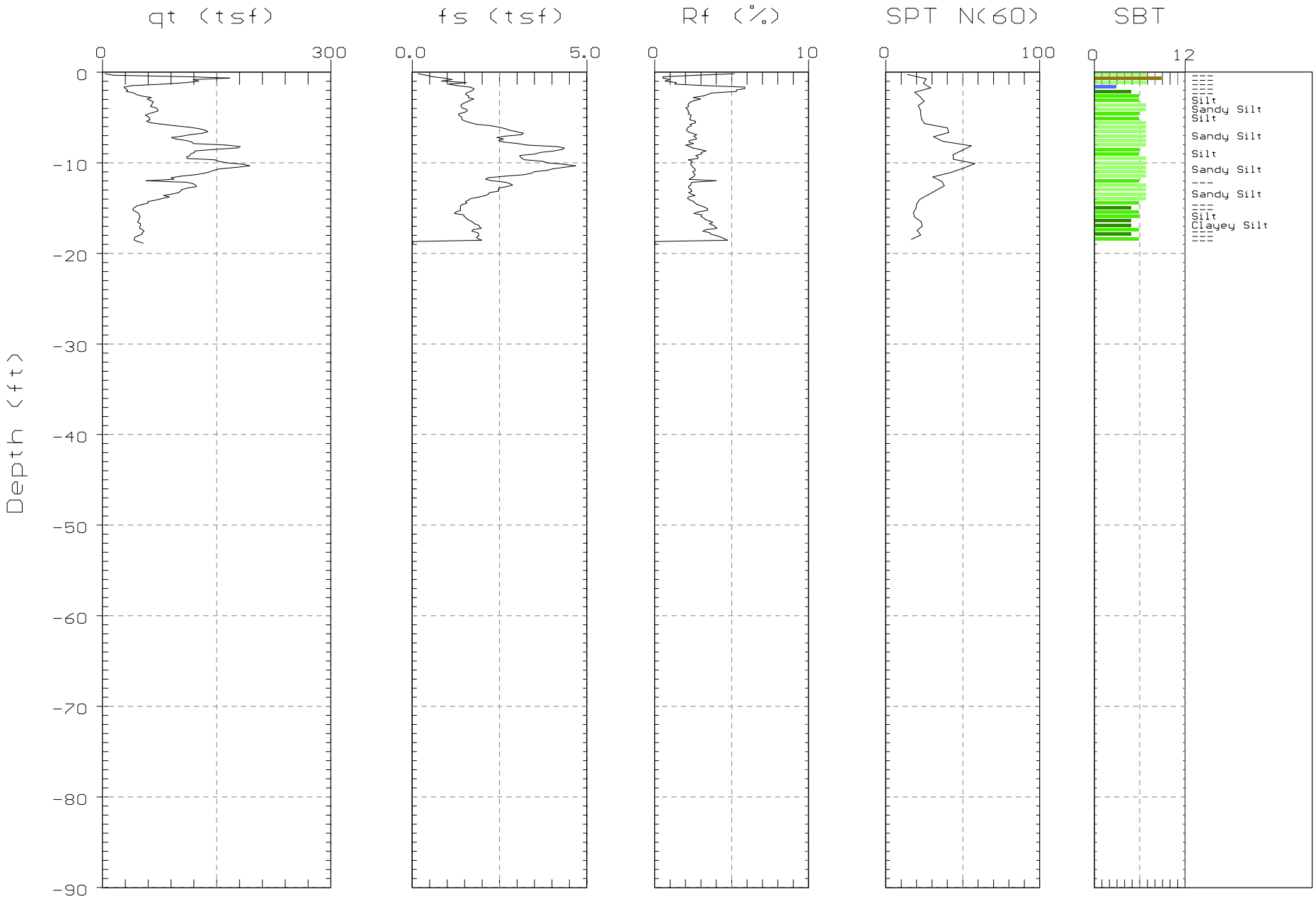
Max. Depth: 34.28 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164174.233E=1847132.668 Engineer: C.SAMS
Location: CPT-1306L=604.3 Date: 05/12/06 09:37



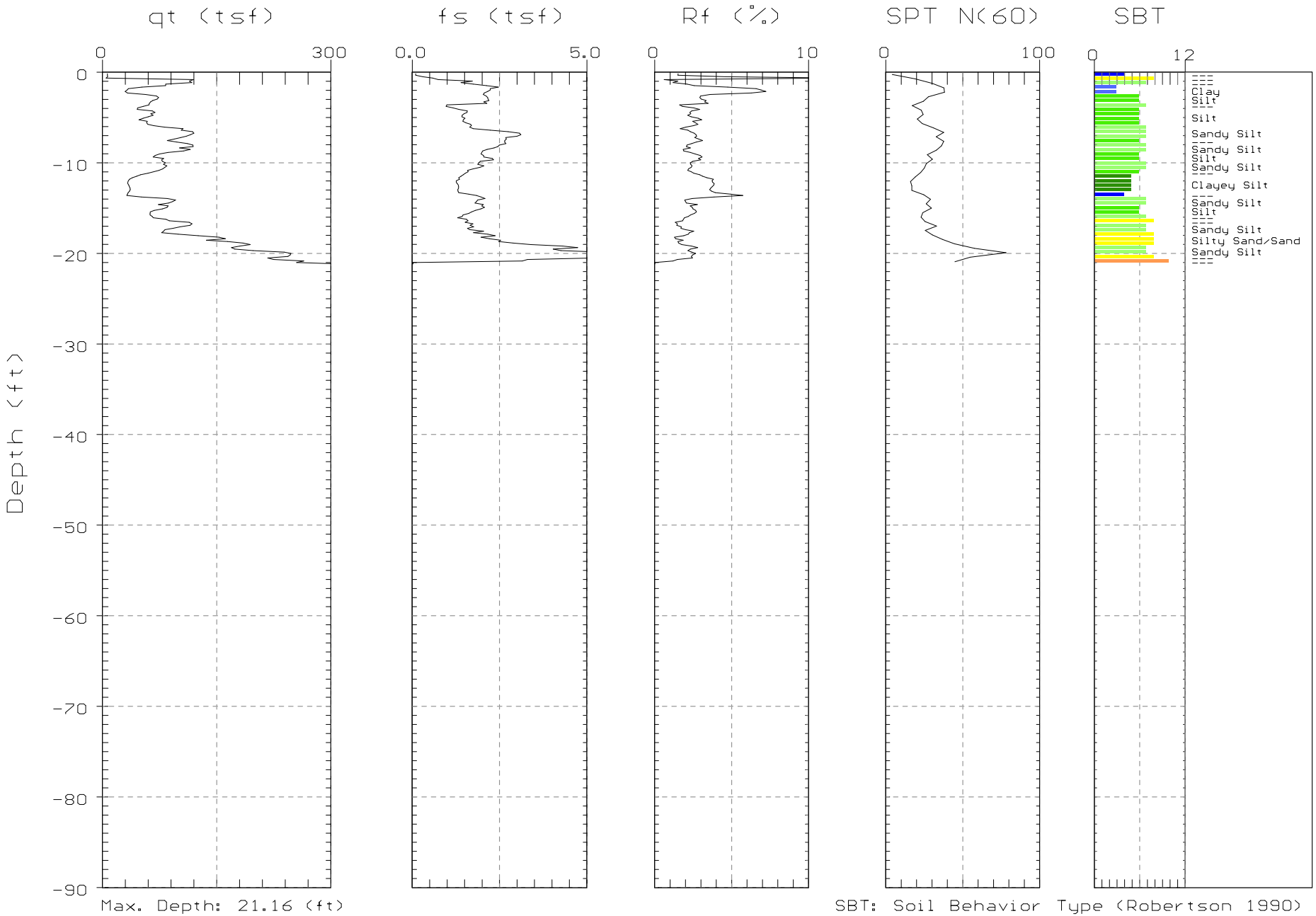
Max. Depth: 18.86 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

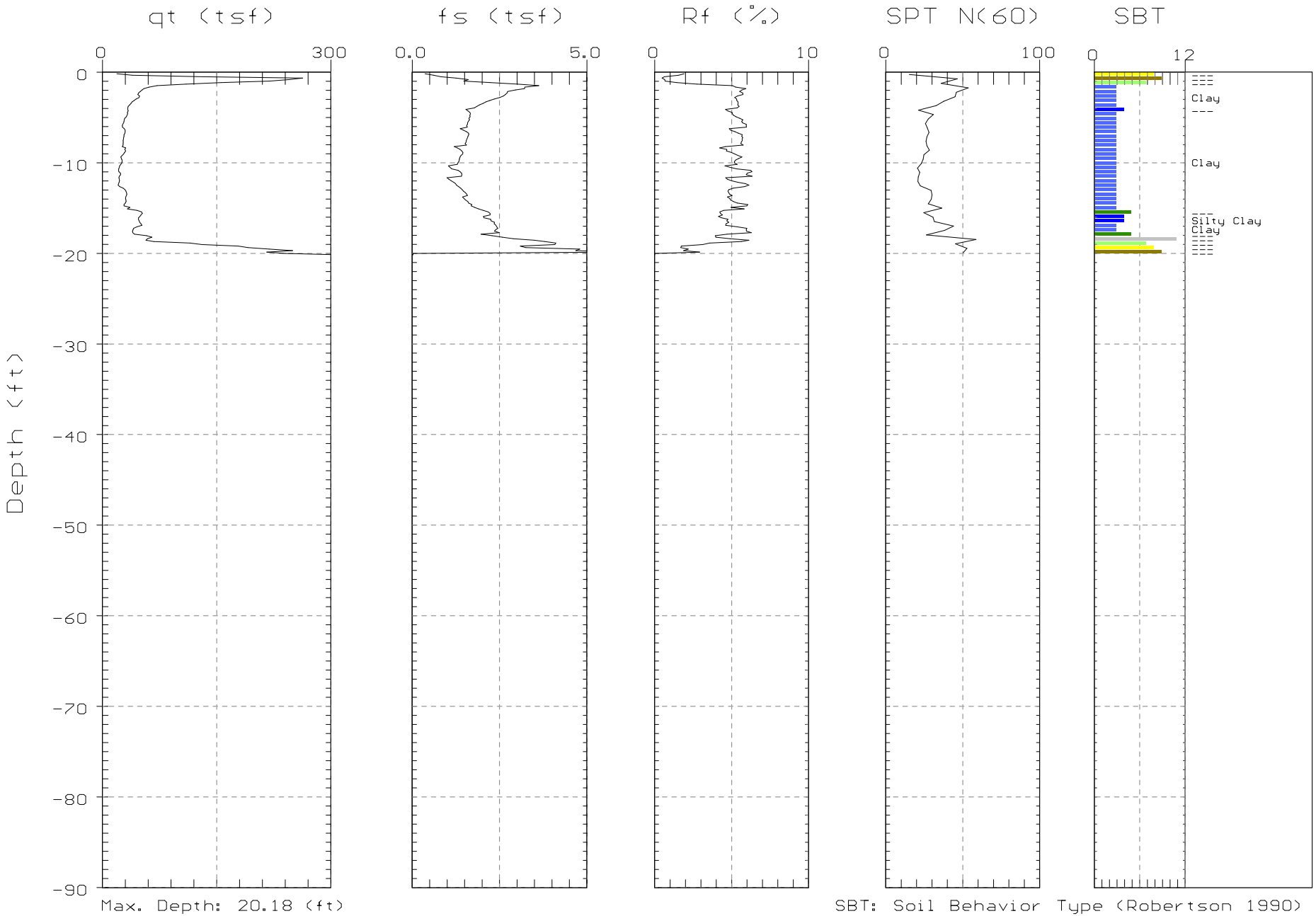
Site: N=1164172.987E=1847128.893 Engineer: C.SAMS
Location: CPT-1306AL=604.3 Date: 05/12/06 10:09



GREGG

MACTEC

Site: N=1166393.067E=1847138.502 Engineer: C.SAMS
Location: CPT-1307L=589.8 Date: 05/16/06 08:51



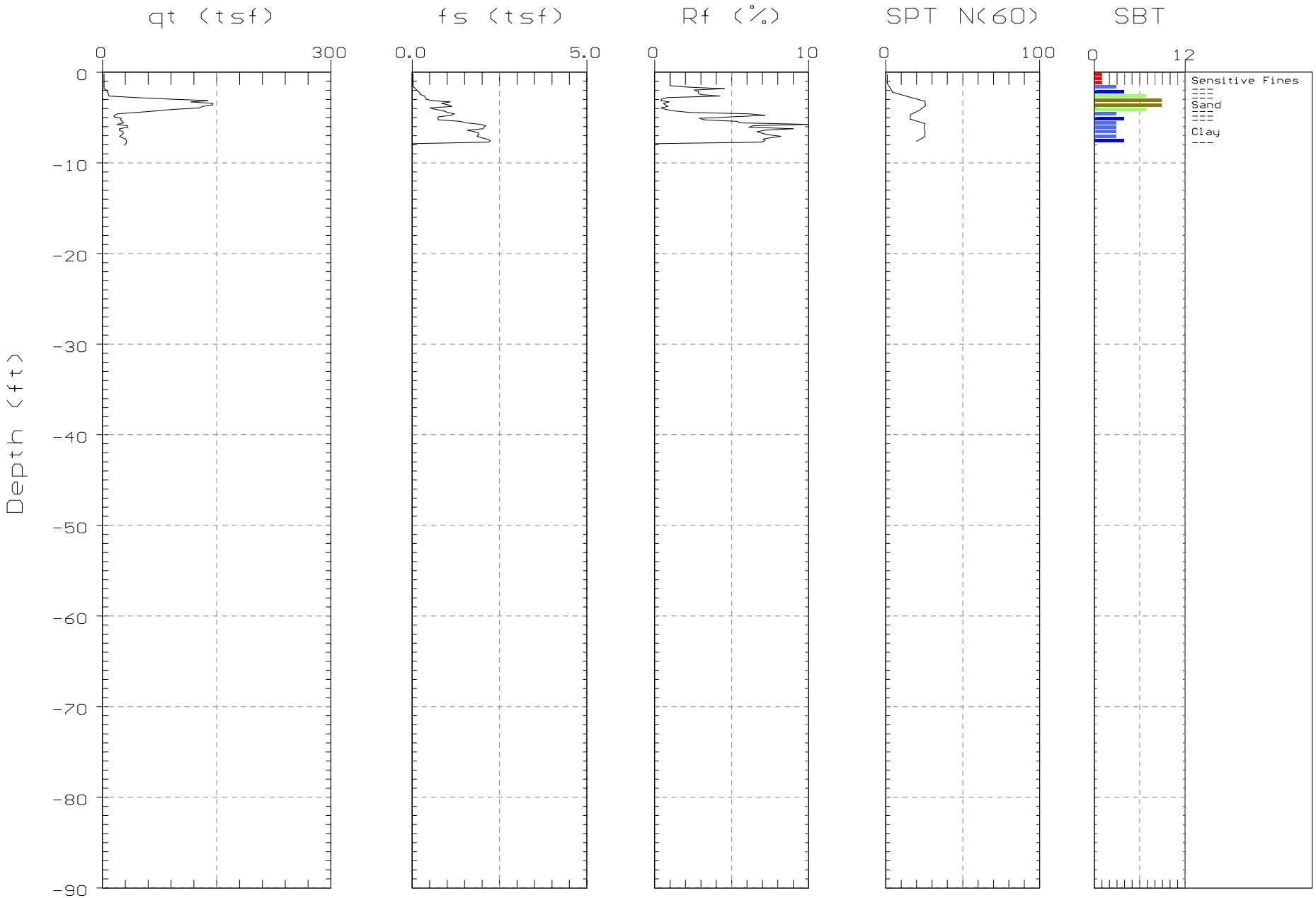
Max. Depth: 20.18 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166994.842E=1844214.37 Engineer: C.SAMS
Location: CPT-1308L=538.0 Date: 05/13/06 11:57



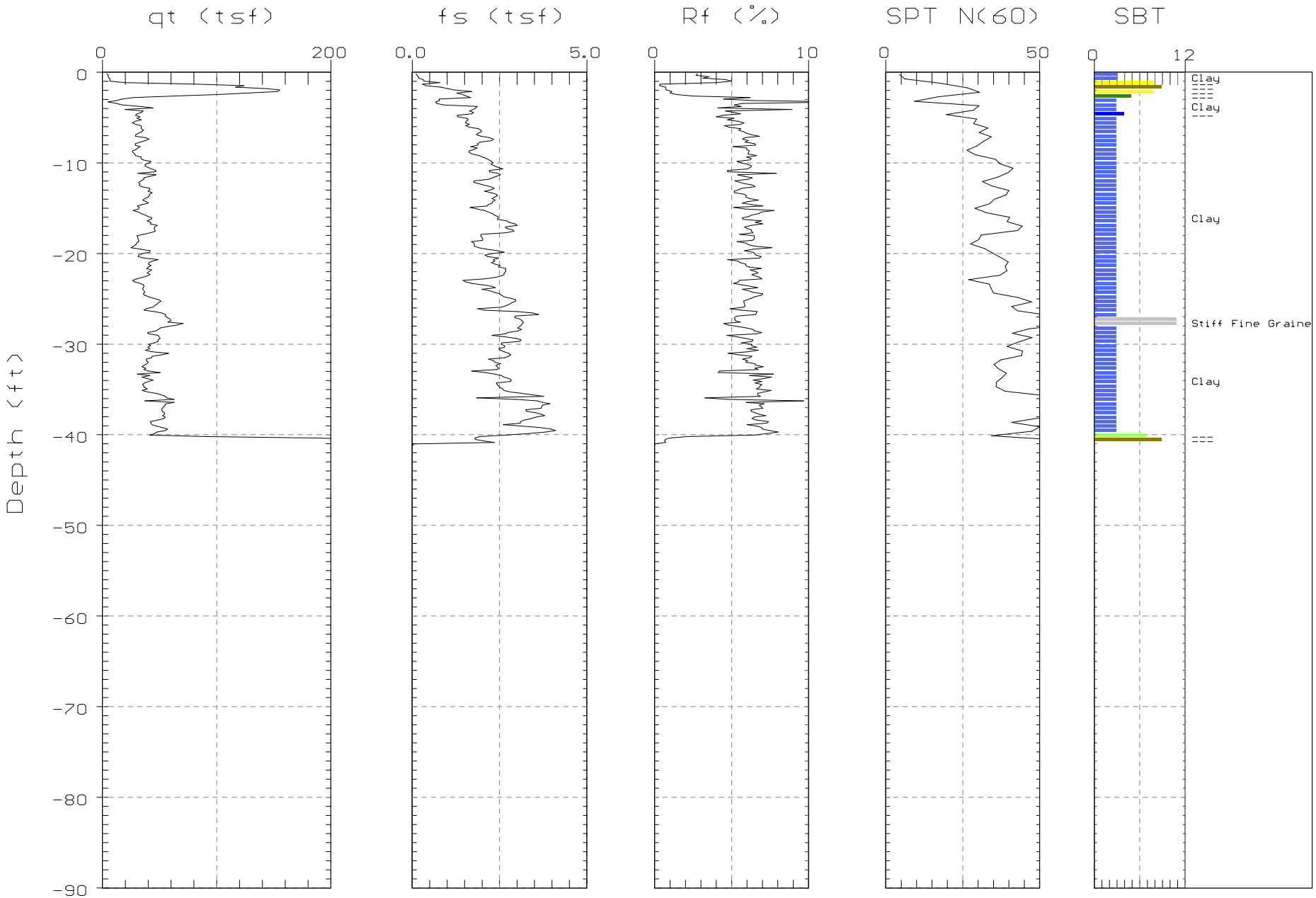
Max. Depth: 8.04 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167001.502E=1844206.906 Engineer: C.SAMS
Location: CPT-1308AL=538.0 Date: 05/14/06 05:56



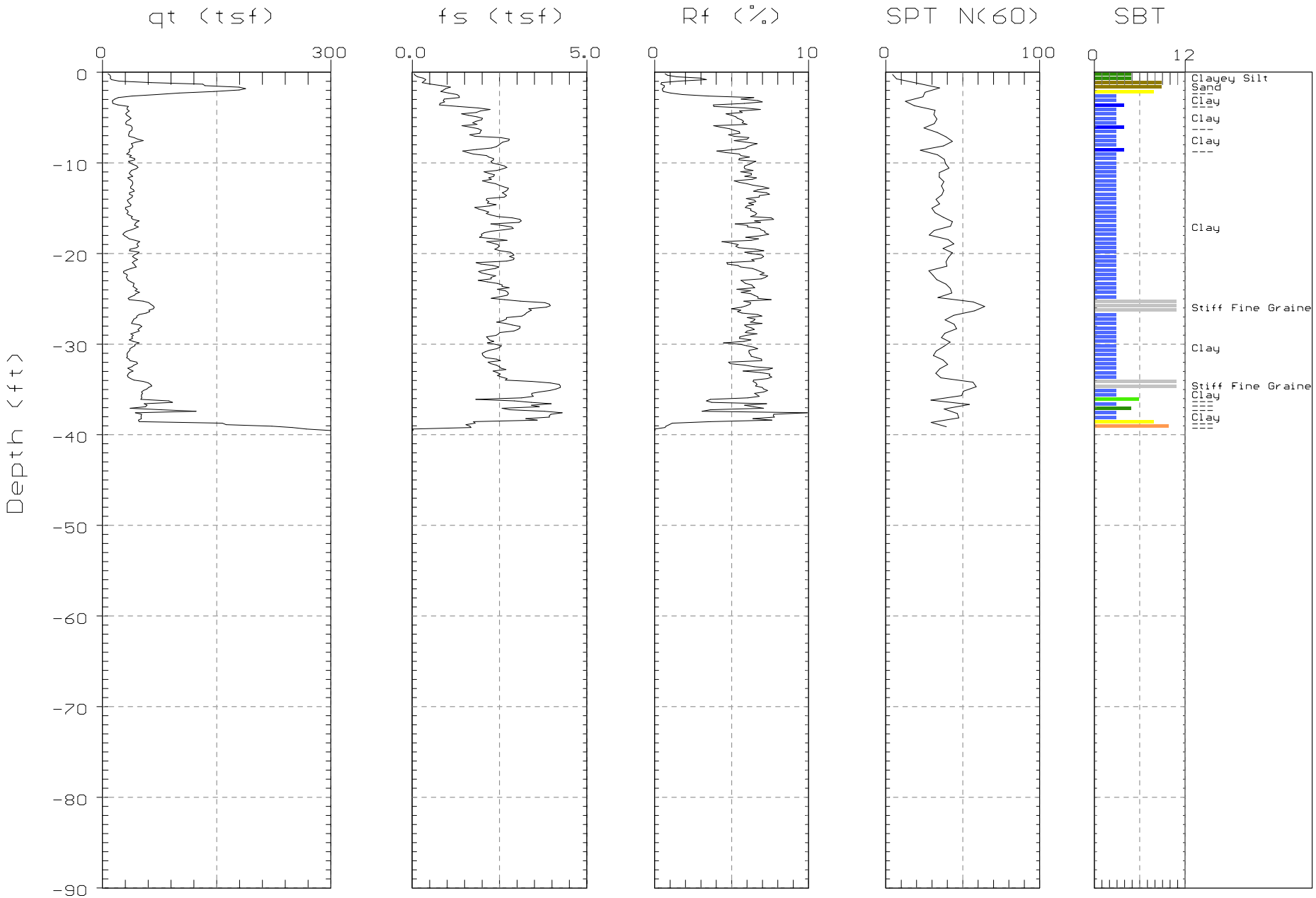
Max. Depth: 41.17 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167008.152E=1844199.436 Engineer: C.SAMS
Location: CPT-1308BL=538.0 Date: 05/16/06 06:35



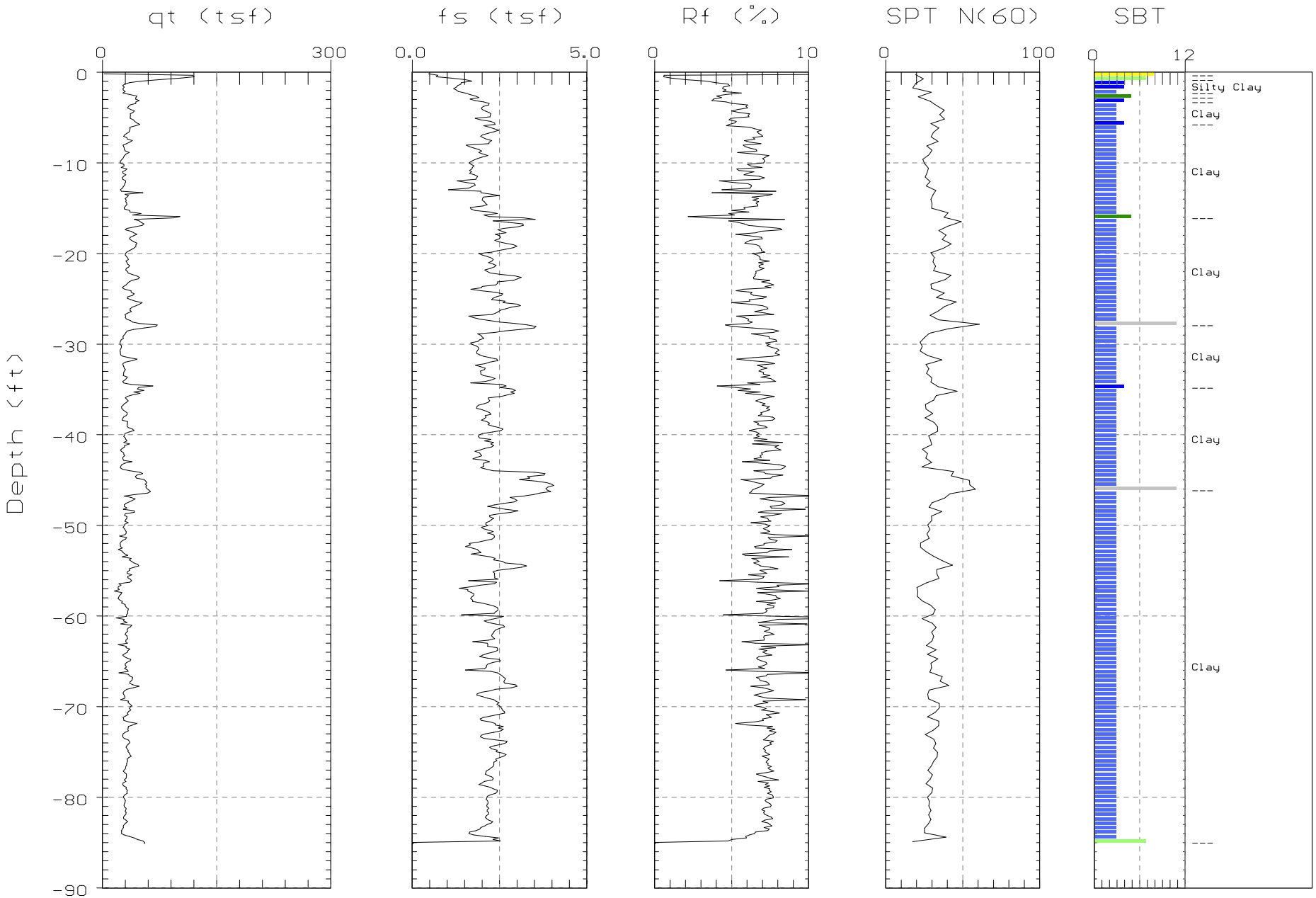
Max. Depth: 39.53 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1166860.56E=1844074.211 Engineer: C.SAMS
Location: CPT-1309L=591.0 Date: 05/14/06 10:04



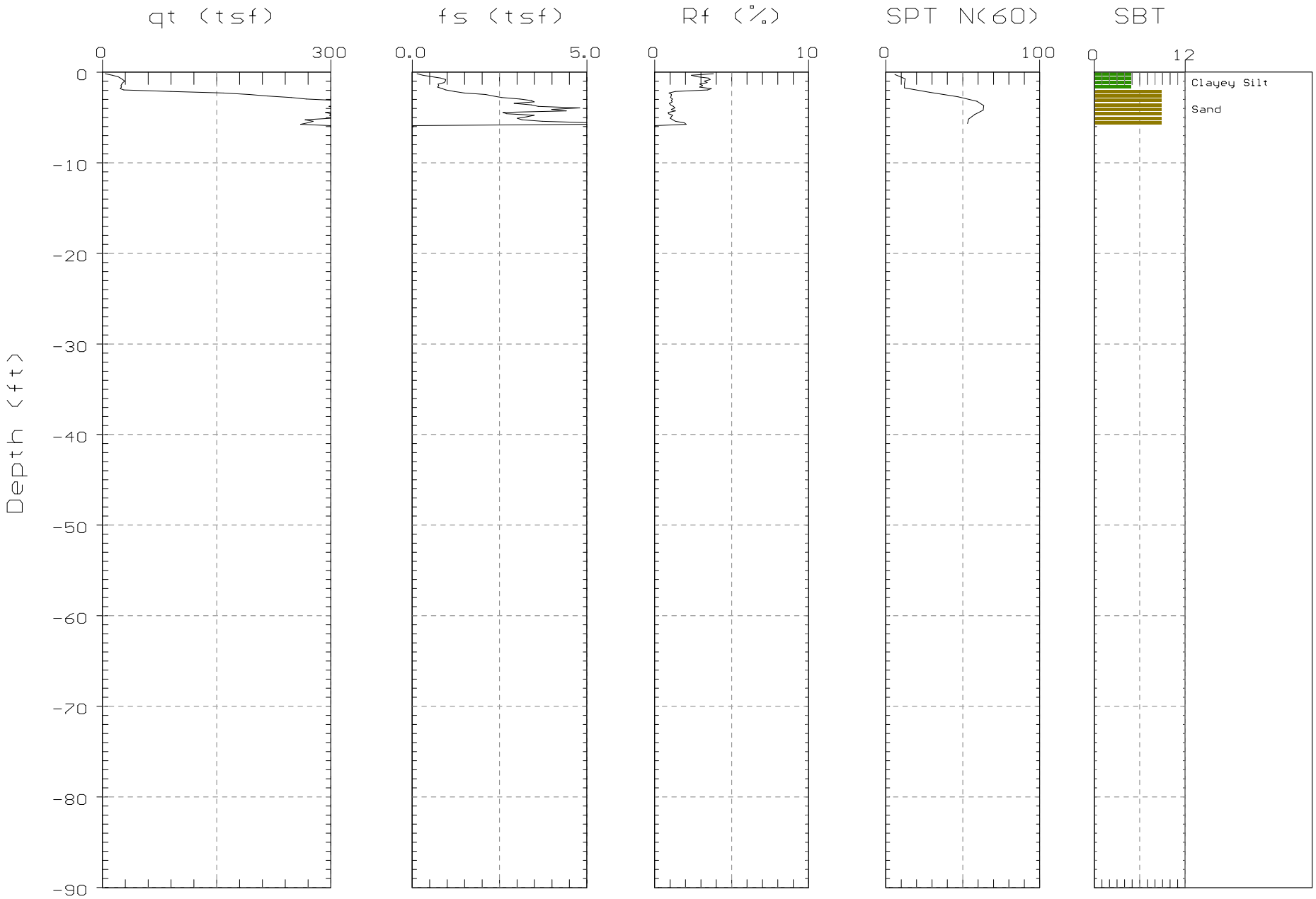
Max. Depth: 85.14 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164932.132E=1846220.577 Engineer: C.SAMS
Location: CPT-1314L=590.0 Date: 05/15/06 13:37



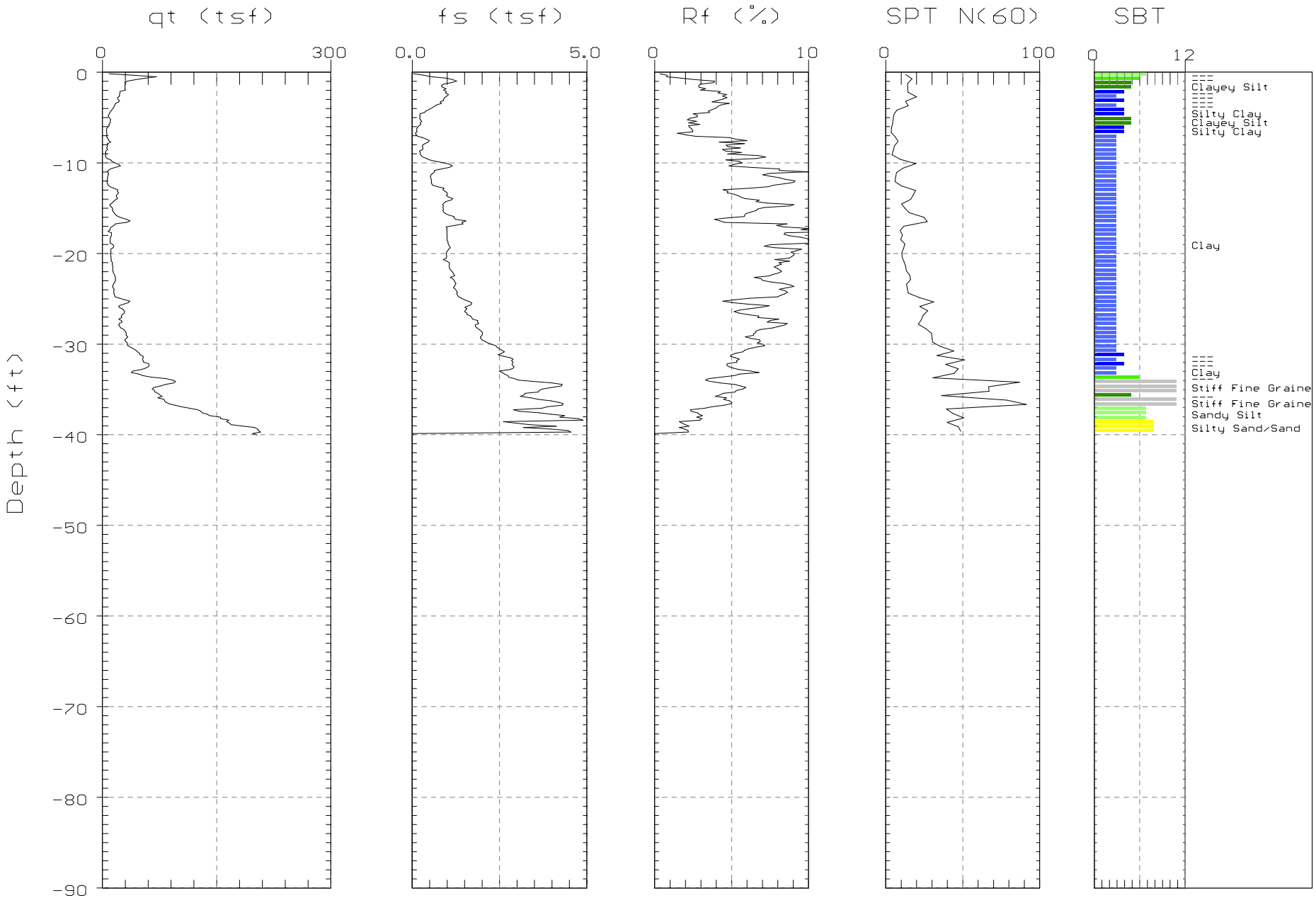
Max. Depth: 6.07 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165032.071E=1846589.827 Engineer: C.SAMS
Location: CPT-1315L=586.9 Date: 05/15/06 12:48



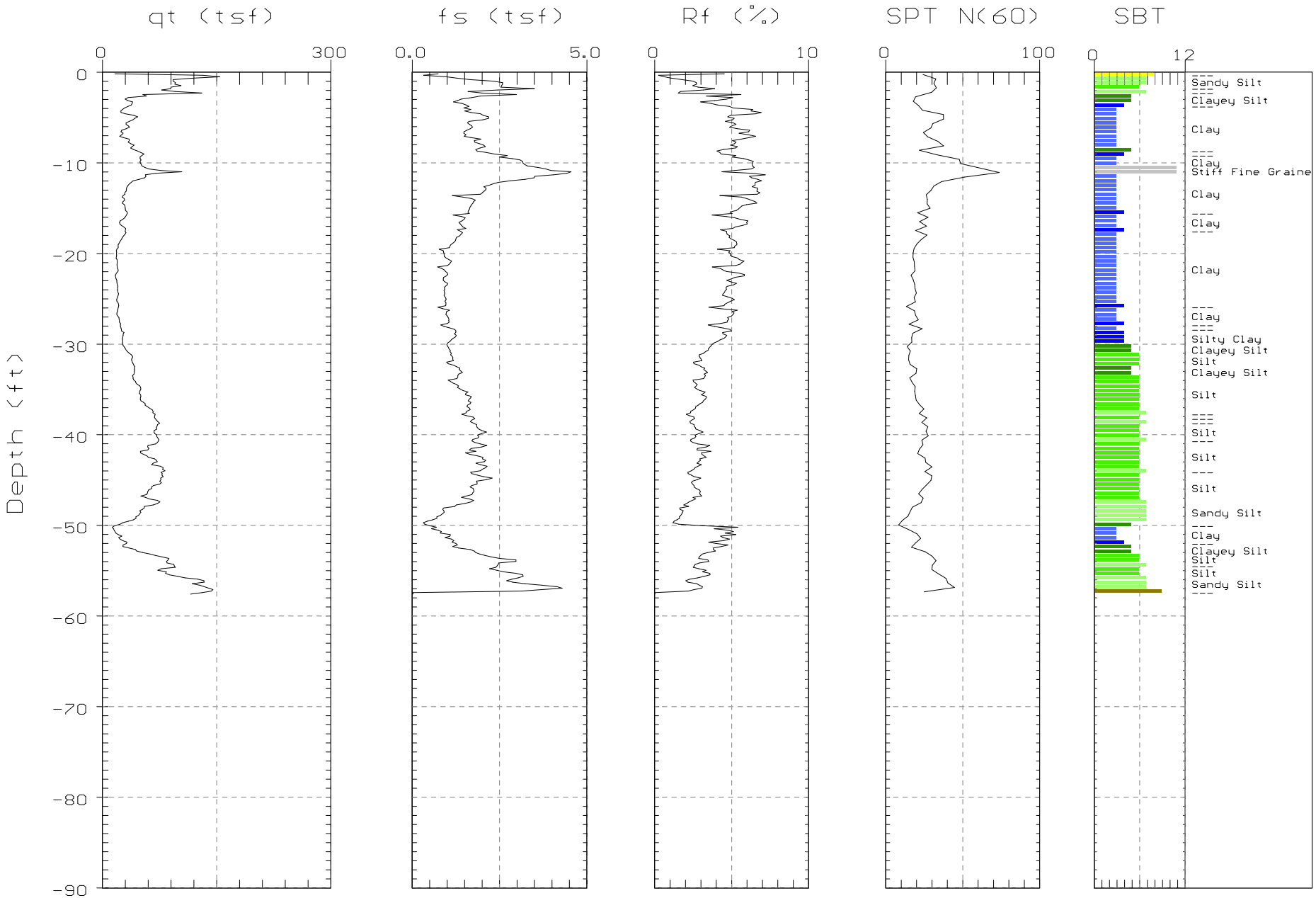
Max. Depth: 40.03 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165442.267E=1847364.975 Engineer: C.SAMS
Location: CPT-1316L=589.6 Date: 05/15/06 11:15



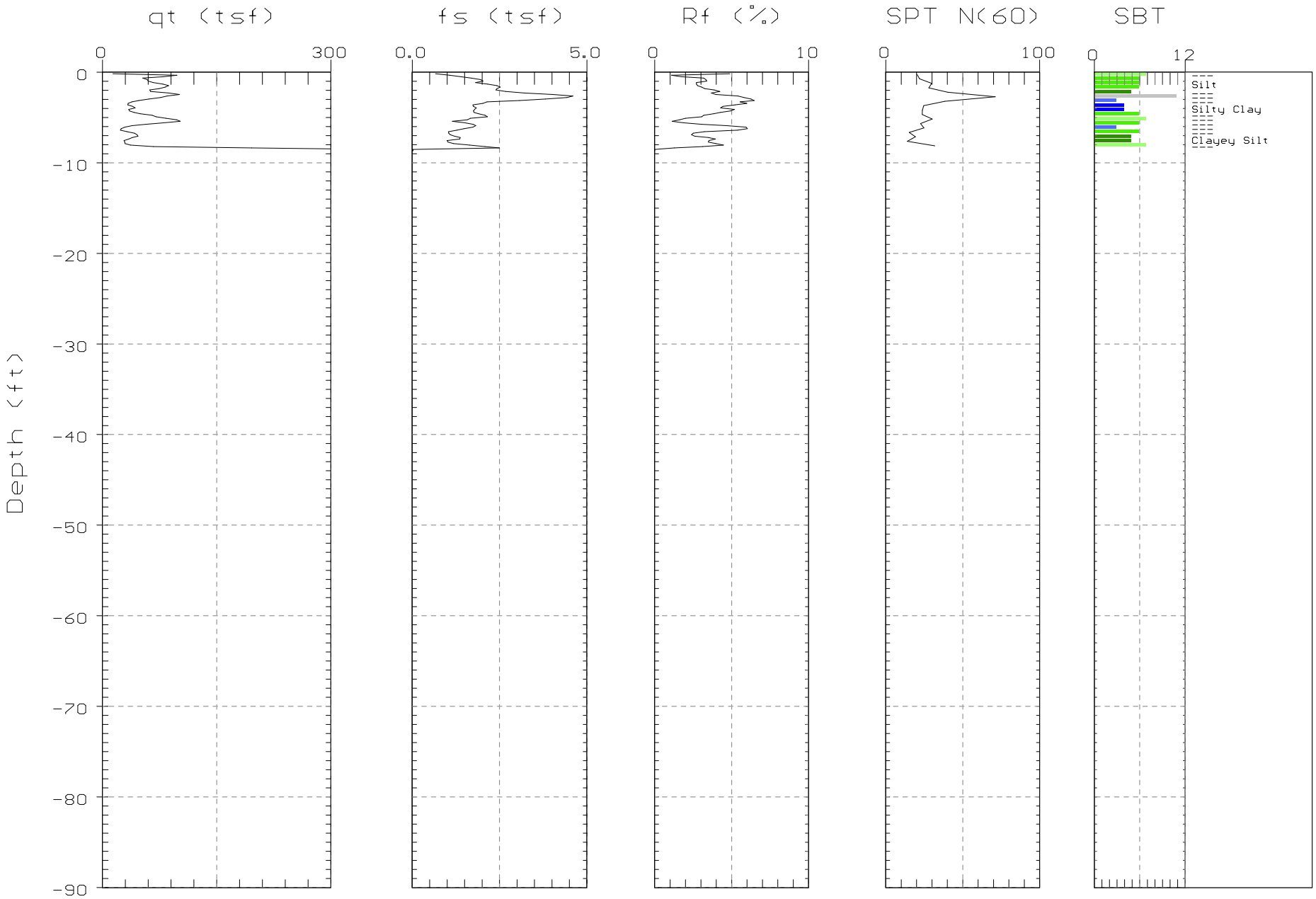
Max. Depth: 57.58 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165480.571E=1847652.112 Engineer: C.SAMS
Location: CPT-1317L=588.7 Date: 05/15/06 10:04



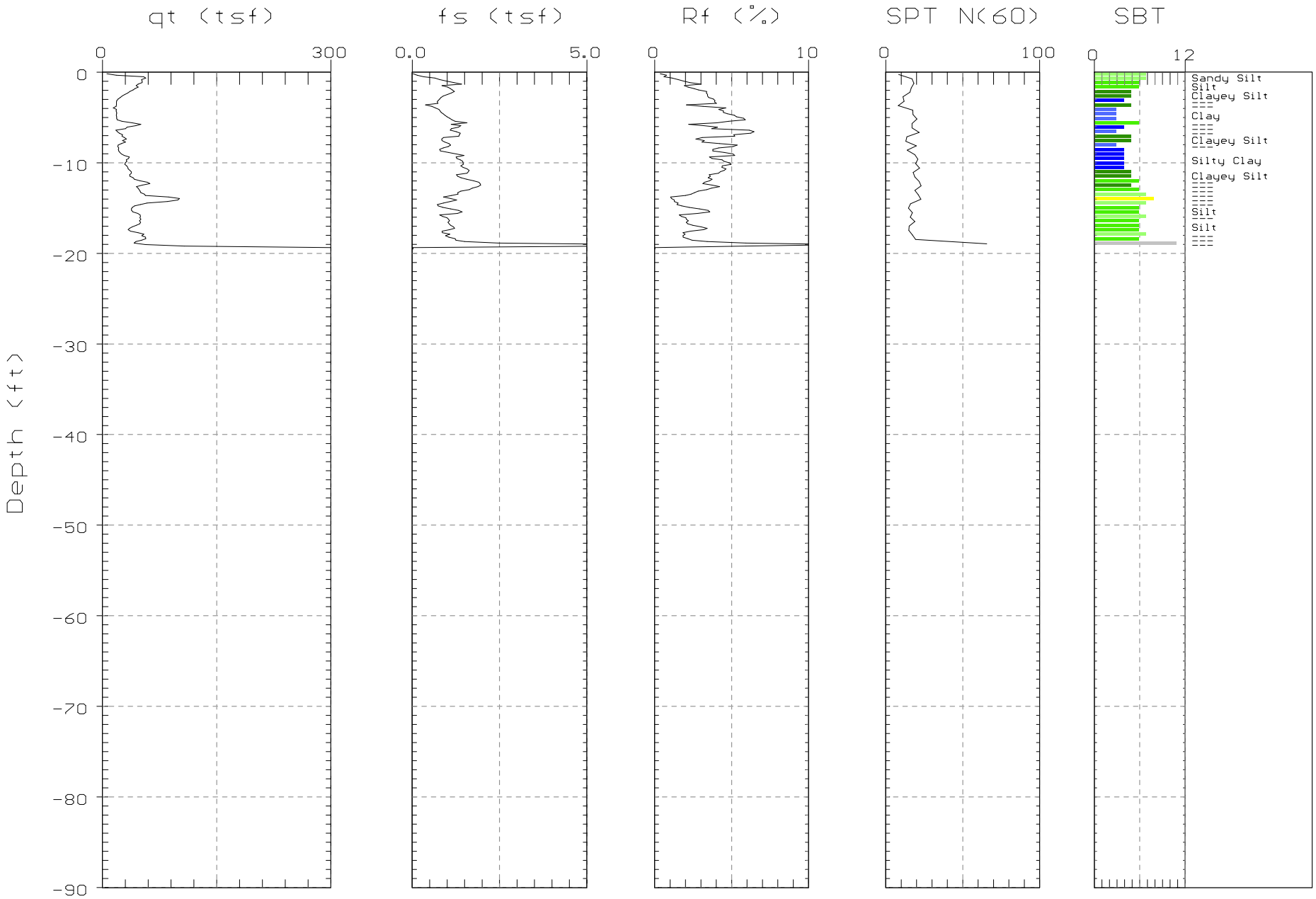
Max. Depth: 8.69 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165481.237E=1847632.773 Engineer: C.SAMS
Location: CPT-1317aL=588.6 Date: 05/15/06 10:36



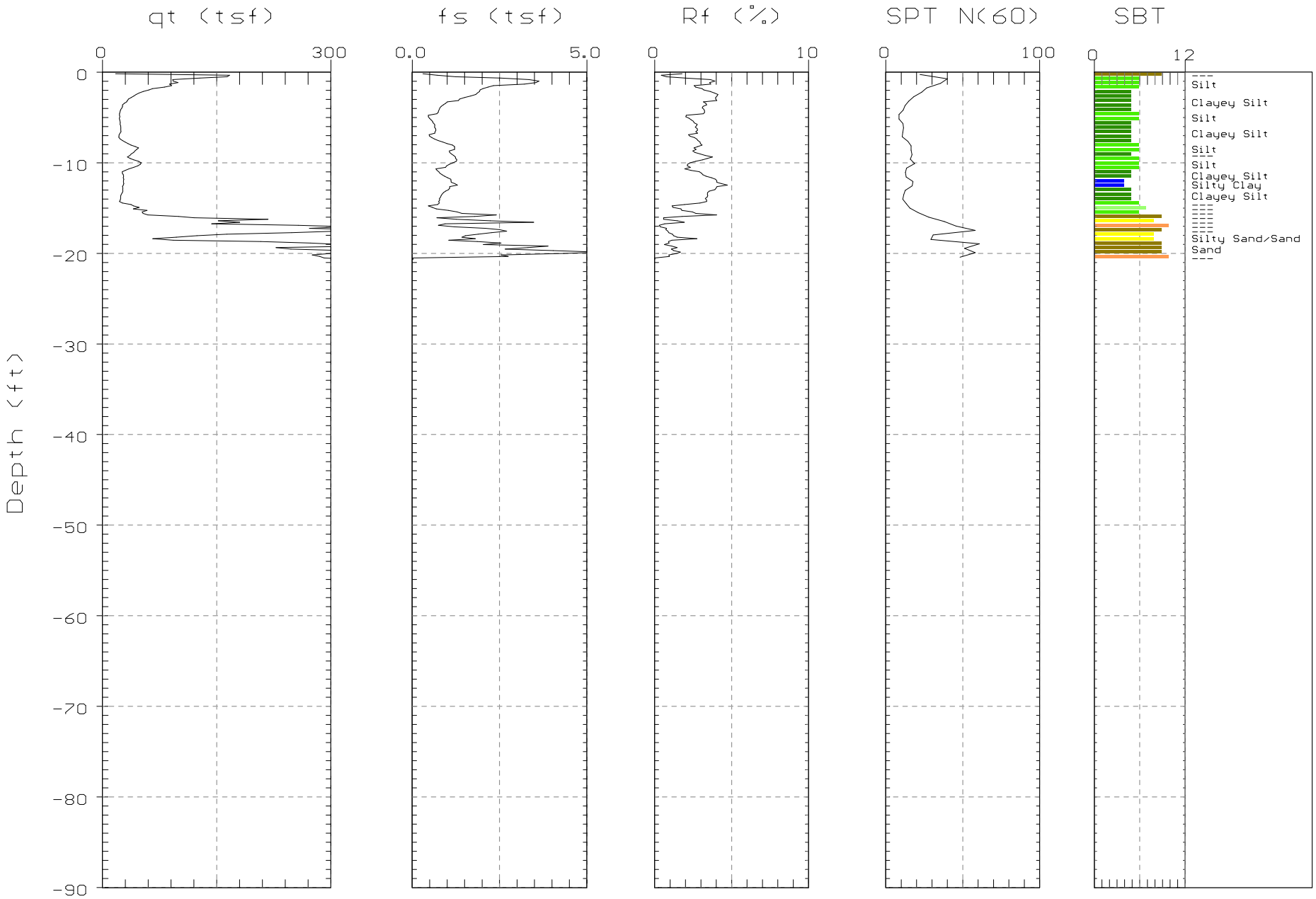
Max. Depth: 19.52 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165497.097E=1847636.907 Engineer: C.SAMS
Location: CPT-1317bL=588.8 Date: 05/16/06 09:30



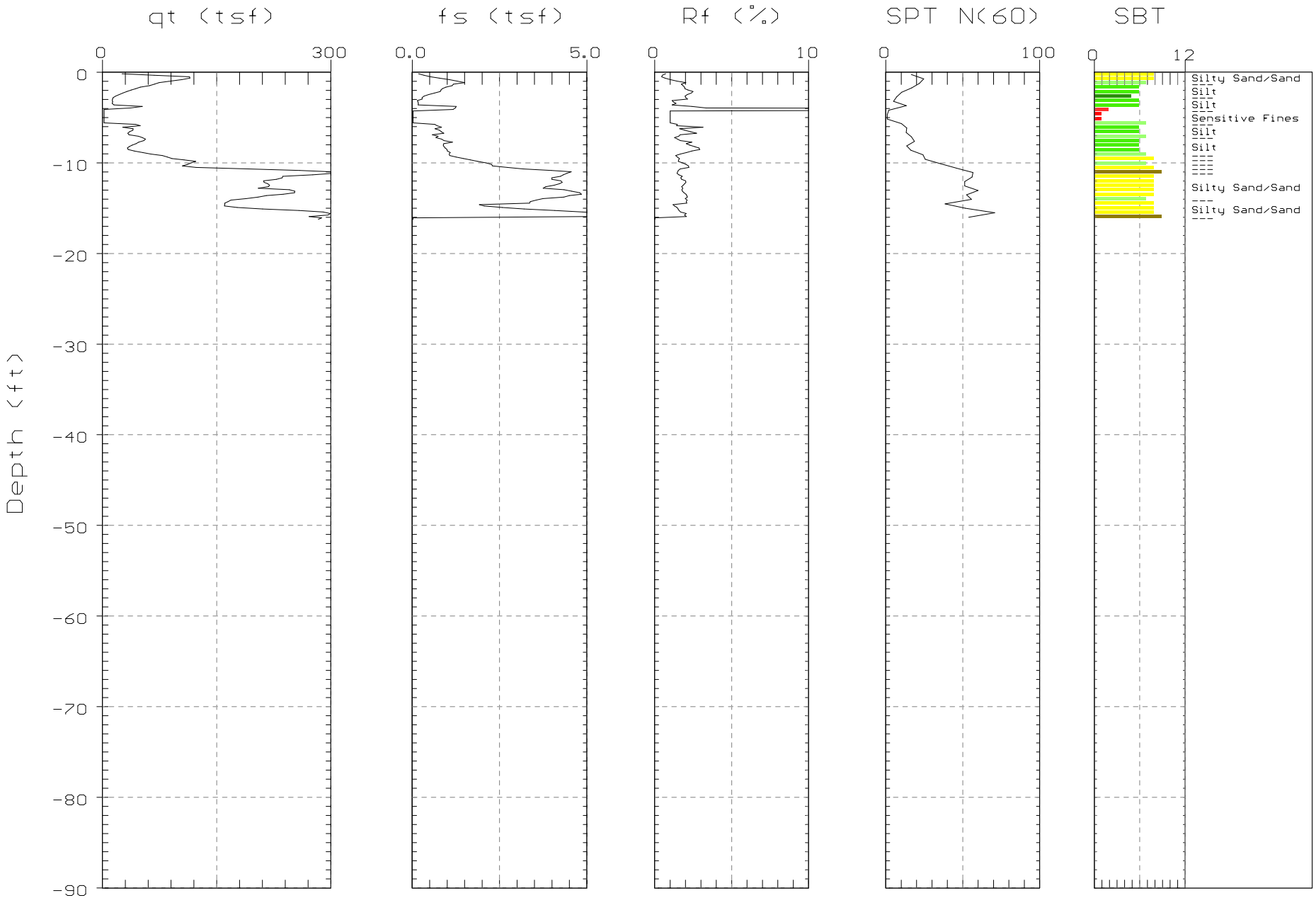
Max. Depth: 20.67 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167614.444E=1847587.31 Engineer: C.SAMS
Location: CPT-1318L=586.4 Date: 05/15/06 08:10



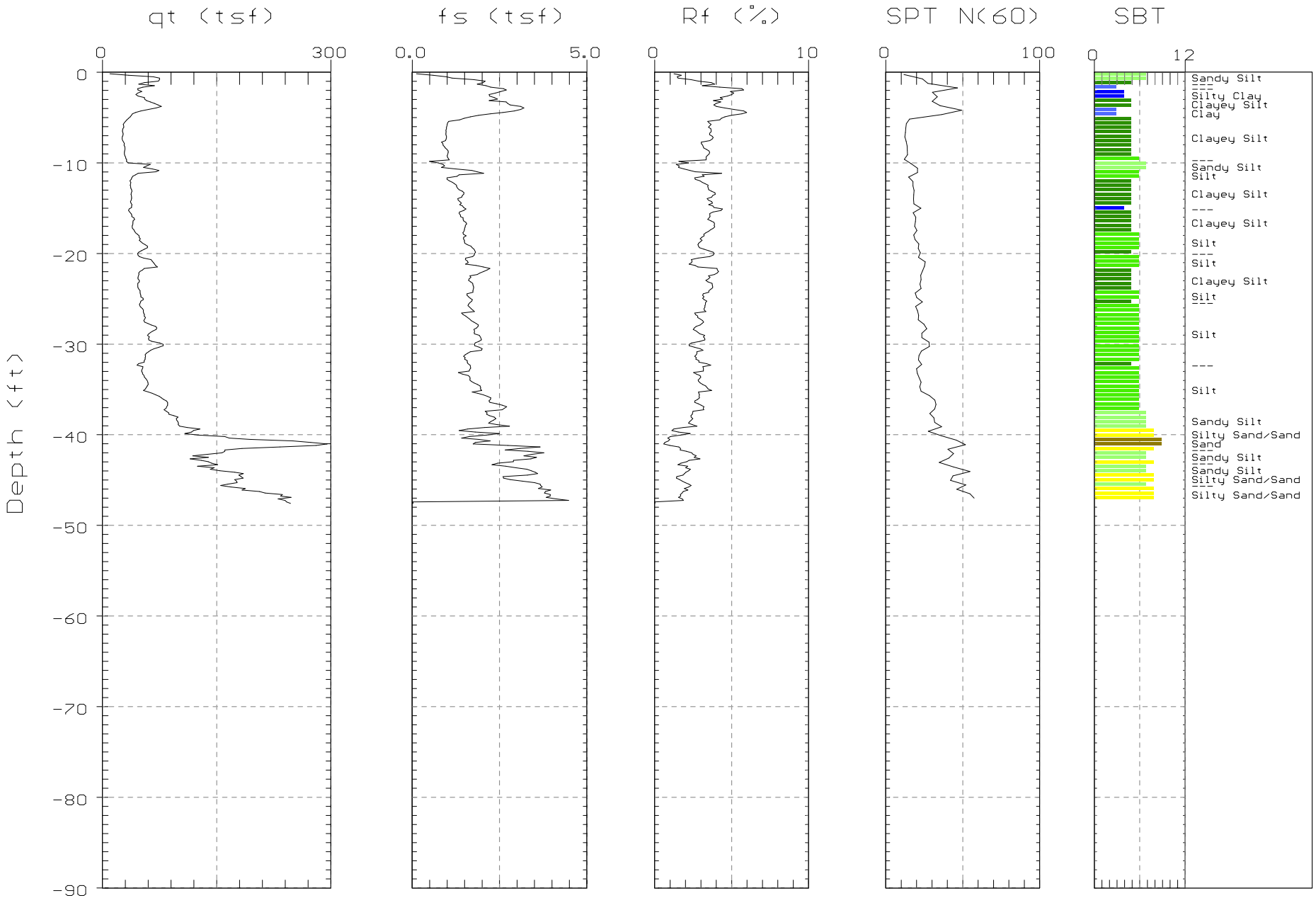
Max. Depth: 16.24 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167695.014E=1847778.705 Engineer: C.SAMS
Location: CPT-1319L=587.9 Date: 05/15/06 05:50



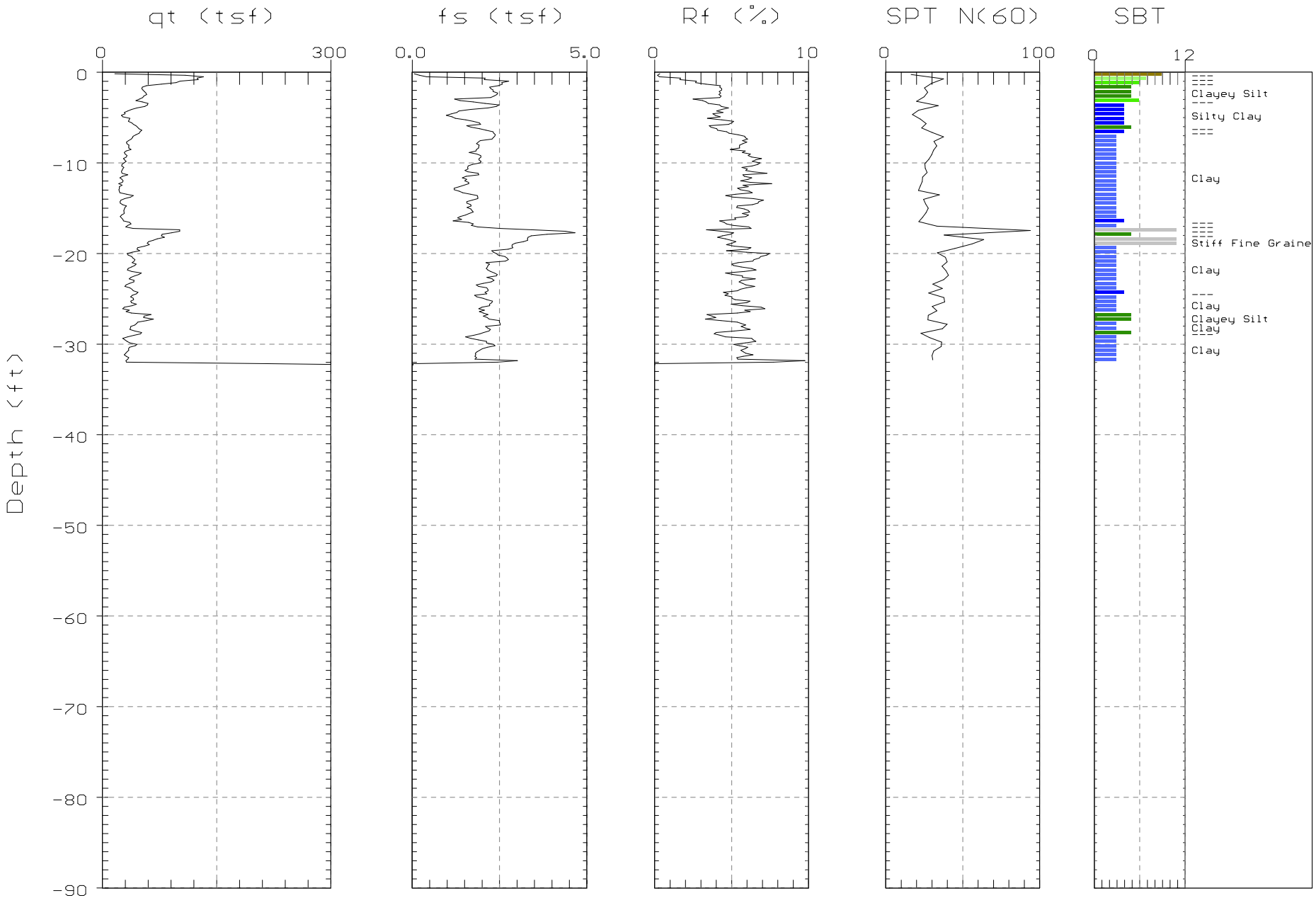
Max. Depth: 47.57 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164809.635E=1847497.262 Engineer: C.SAMS
Location: CPT-1320L=604.9 Date: 08/20/06 08:56



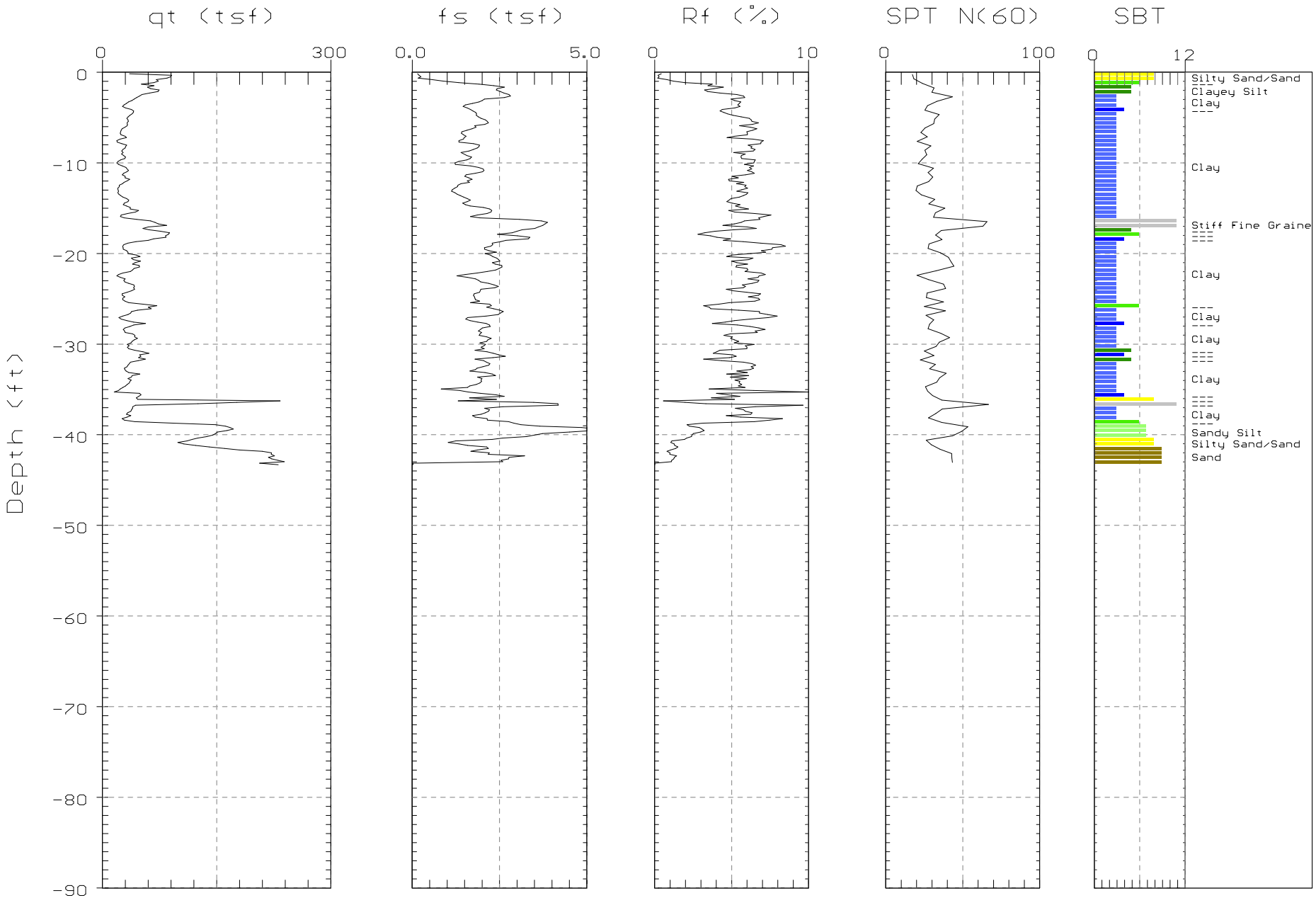
Max. Depth: 32.32 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164802.258E=1847460.695 Engineer: C.SAMS
Location: CPT-1321L=604.9 Date: 08/20/06 10:17



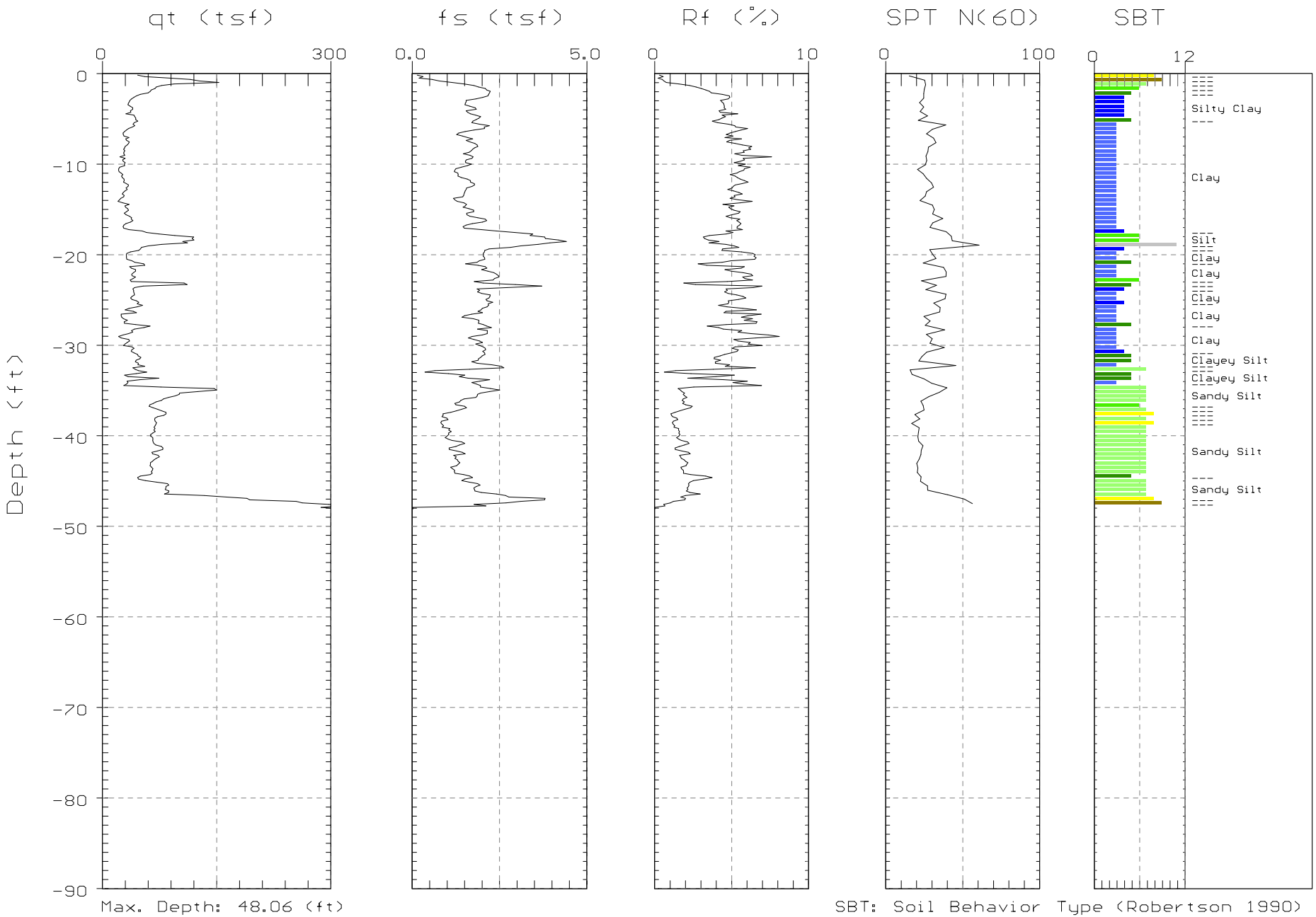
Max. Depth: 43.31 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164794.98E=1847472.657 Engineer: C.SAMS
Location: CPT-1322L=605.2 Date: 08/20/06 07:01



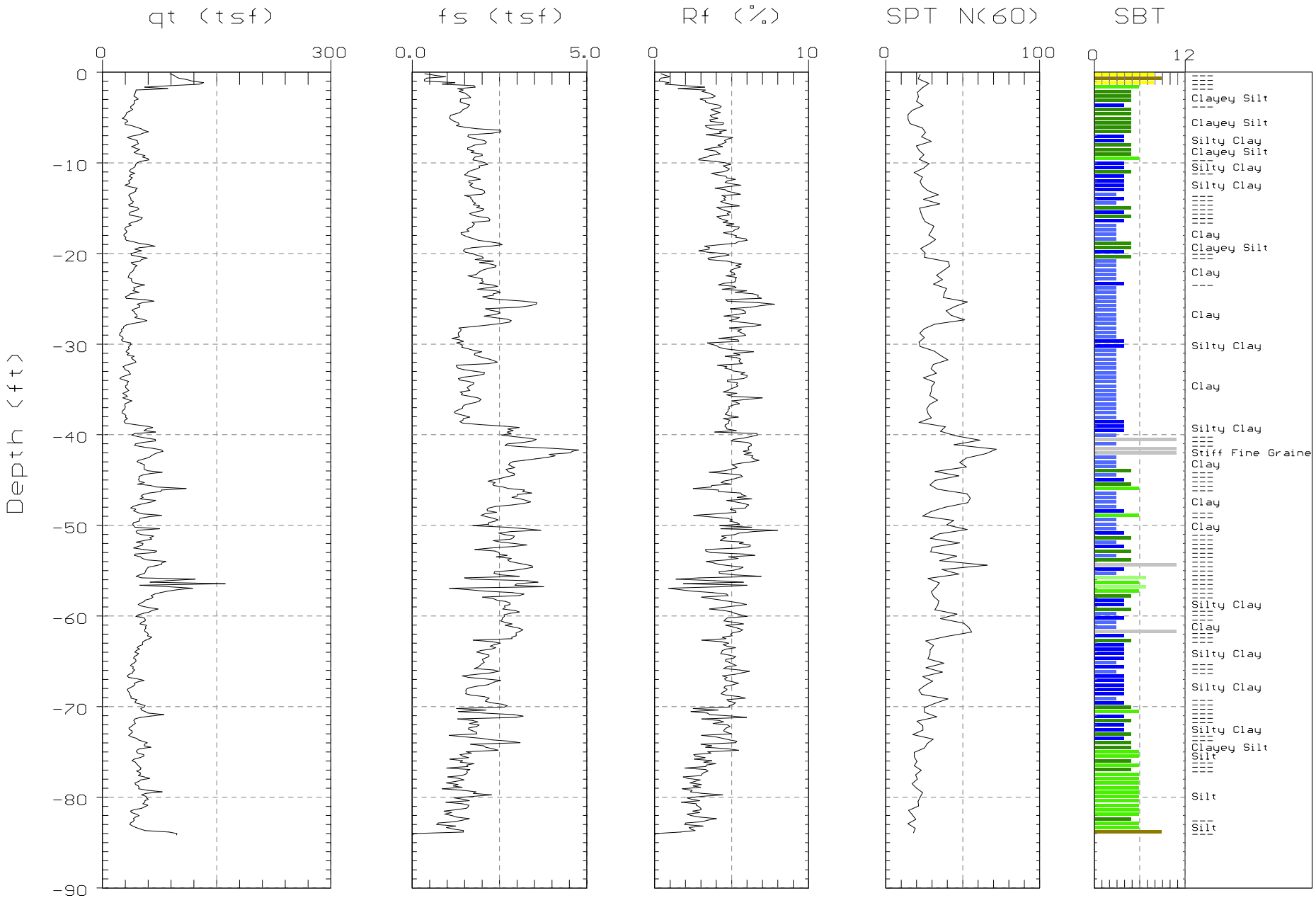
Max. Depth: 48.06 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165679.211E=1848305.418 Engineer: C.SAMS
Location: CPT-1323L=610.5 Date: 08/19/06 05:19



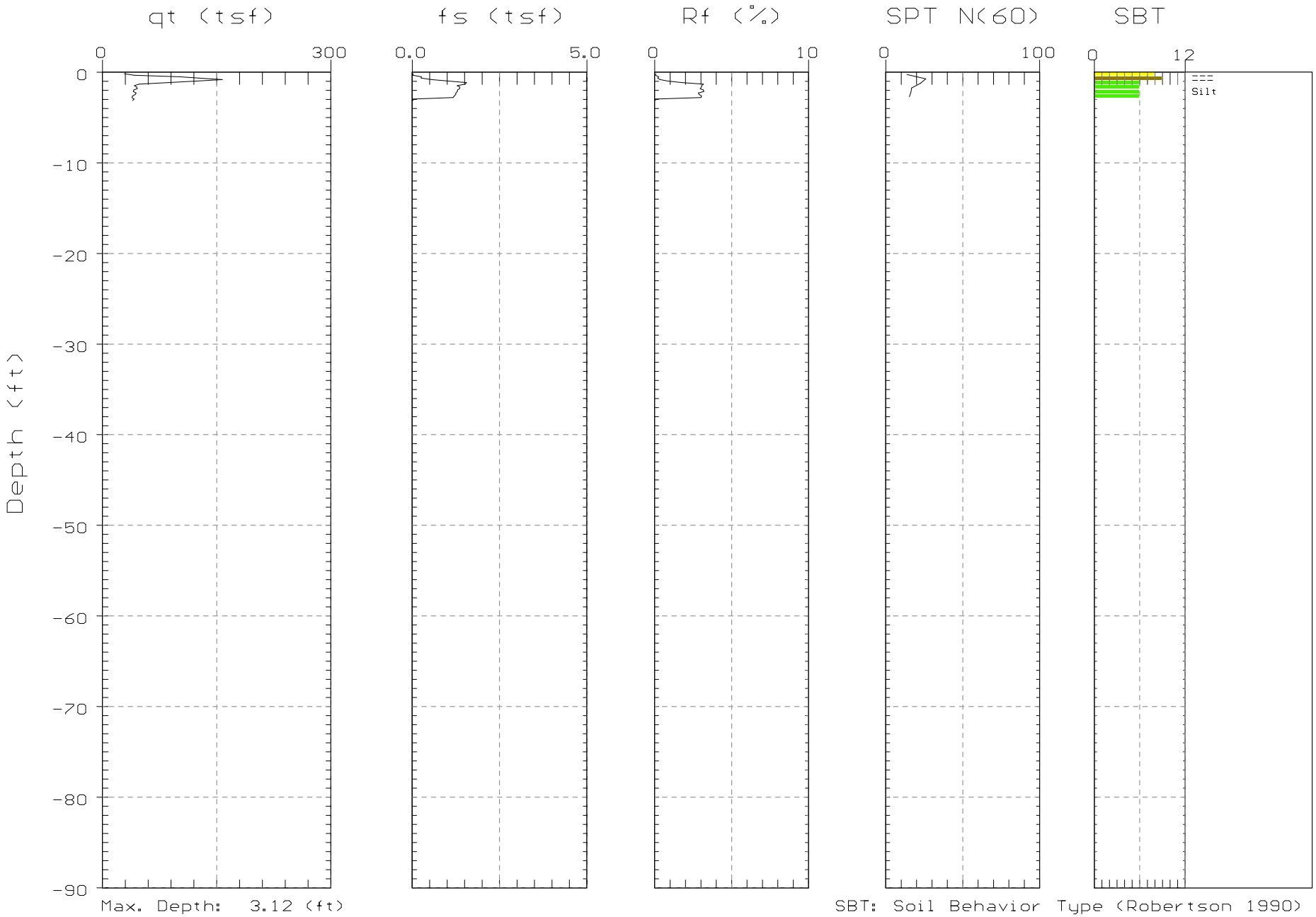
Max. Depth: 84.15 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165733.296E=1848334.24 Engineer: C.SAMS
Location: CPT-1324L=610.2 Date: 08/19/06 08:43



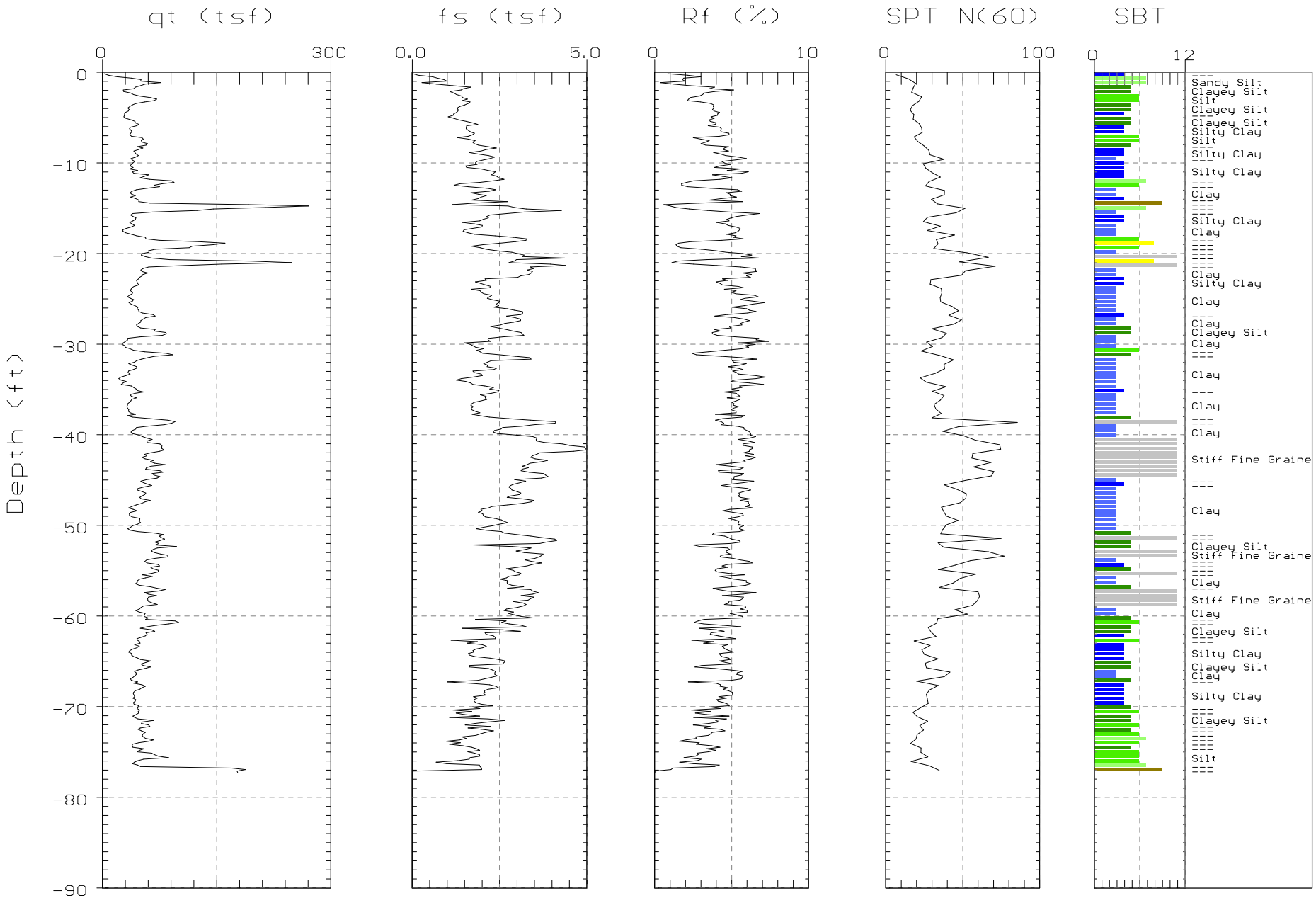
Max. Depth: 3.12 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165733.296E=1848334.24 Engineer: C.SAMS
Location: CPT-1324BL=610.2 Date: 08/19/06 09:02



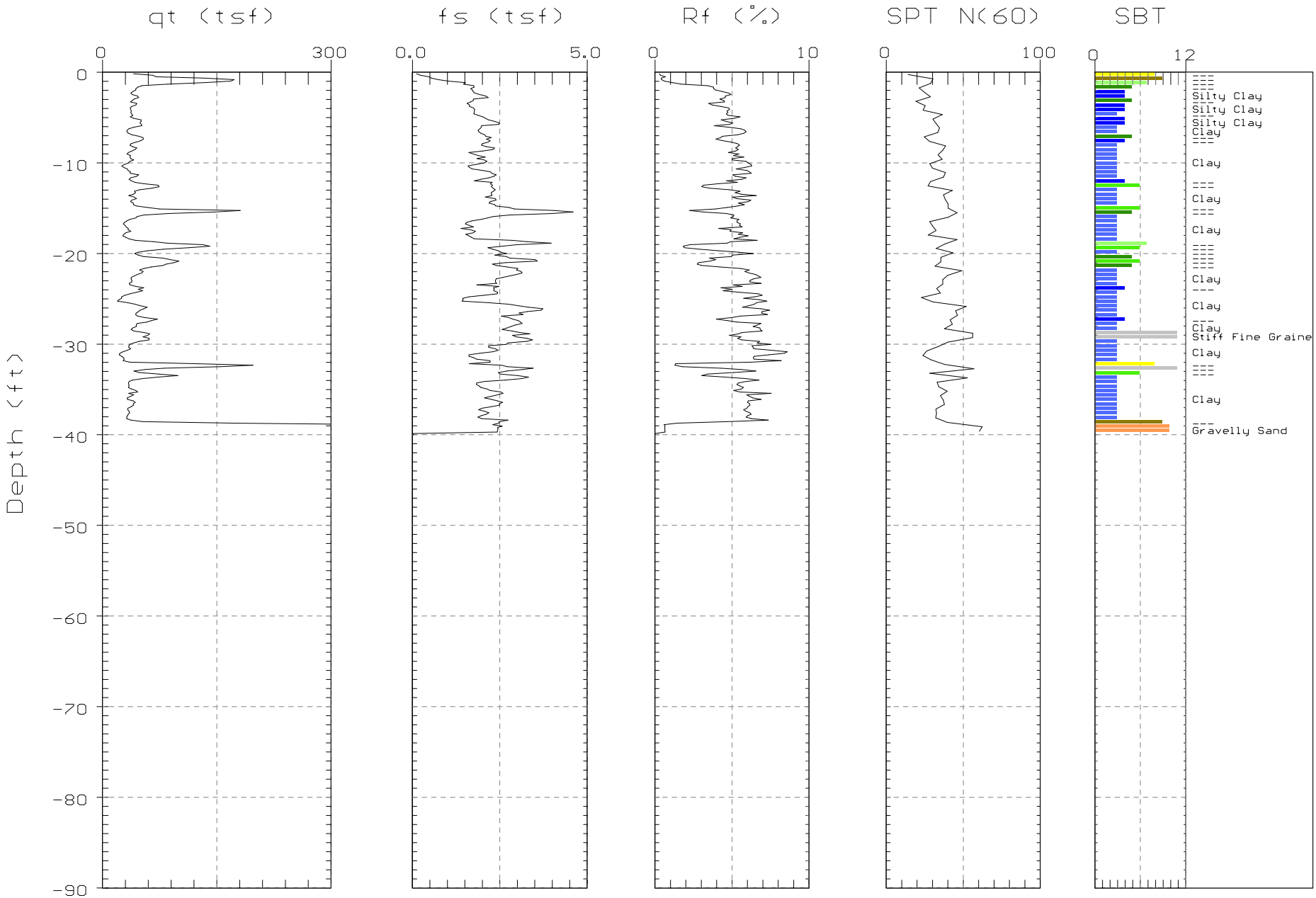
Max. Depth: 77.26 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165730.729E=1848273.937 Engineer: C.SAMS
Location: CPT-1325L=610.3 Date: 08/19/06 11:35



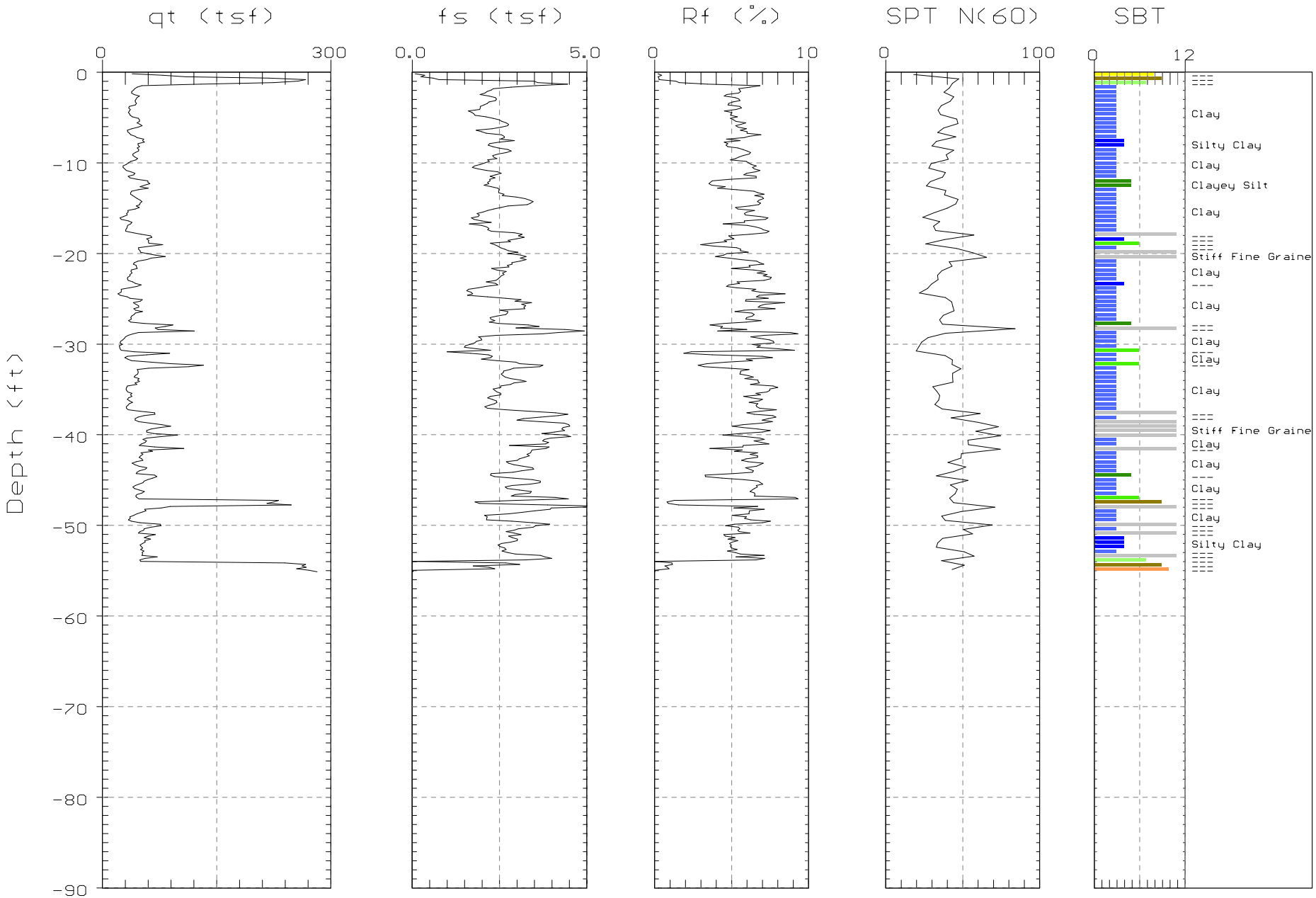
Max. Depth: 40.03 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165728.968E=1848272.952 Engineer: C.SAMS
Location: CPT-1325AL=610.1 Date: 08/19/06 12:39



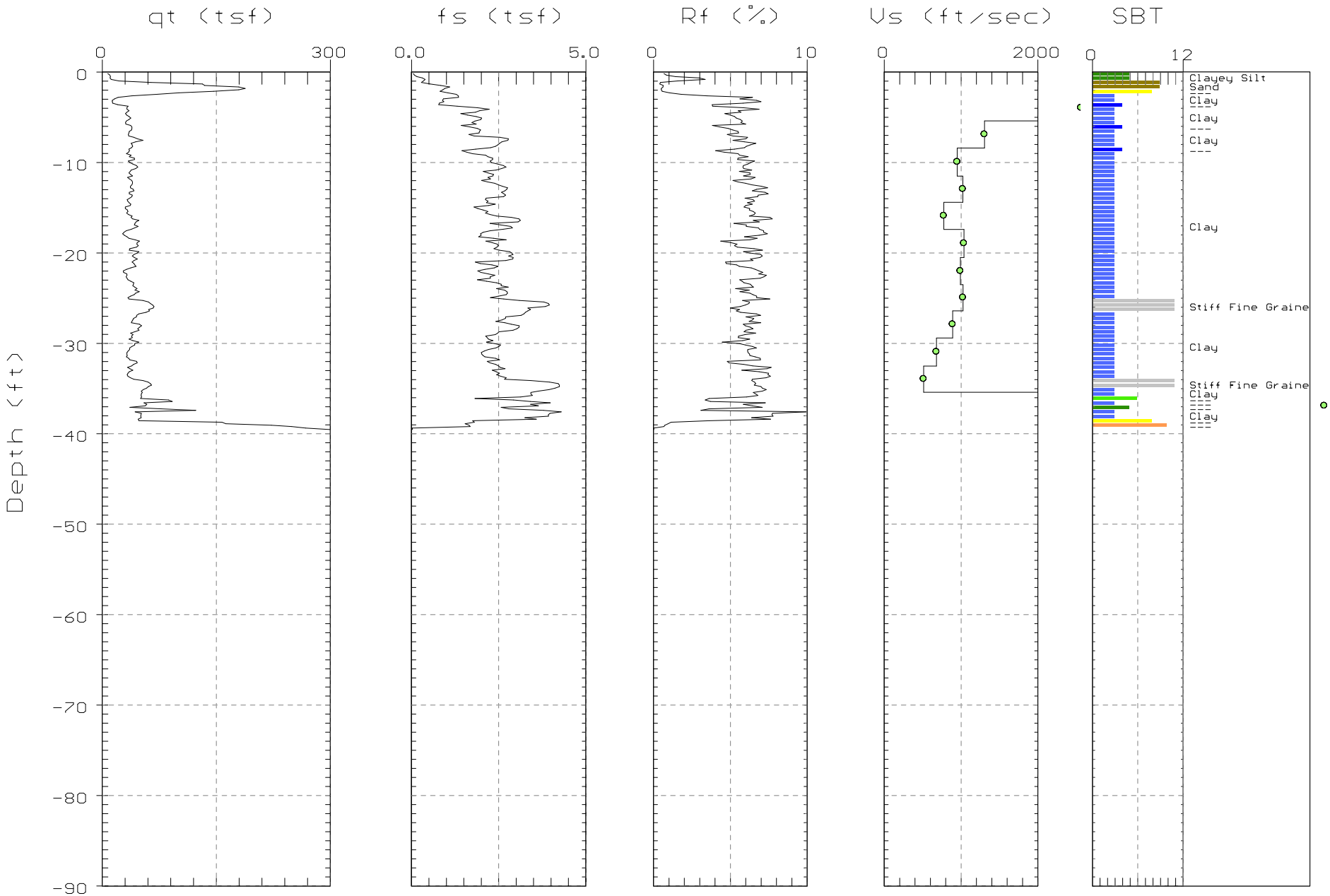
Max. Depth: 55.12 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167001.502E=1844206.906 Engineer: C.SAMS
Location: CPT-1308AL=538.0 Date: 05/14/06 05:56



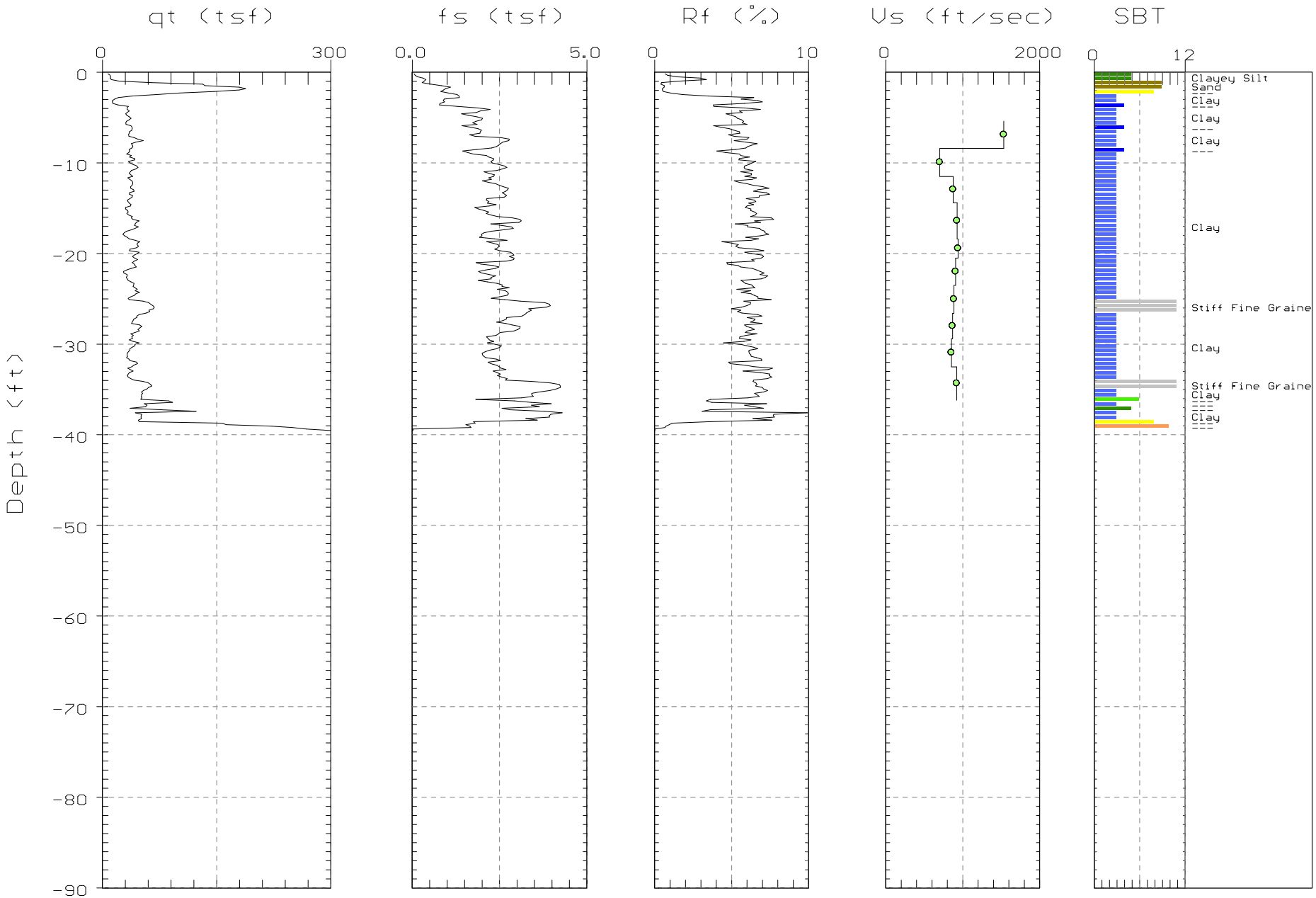
Max. Depth: 39.53 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1167008.152E=1844199.436 Engineer: C.SAMS
Location: CPT-1308BL=538.0 Date: 05/16/06 06:35



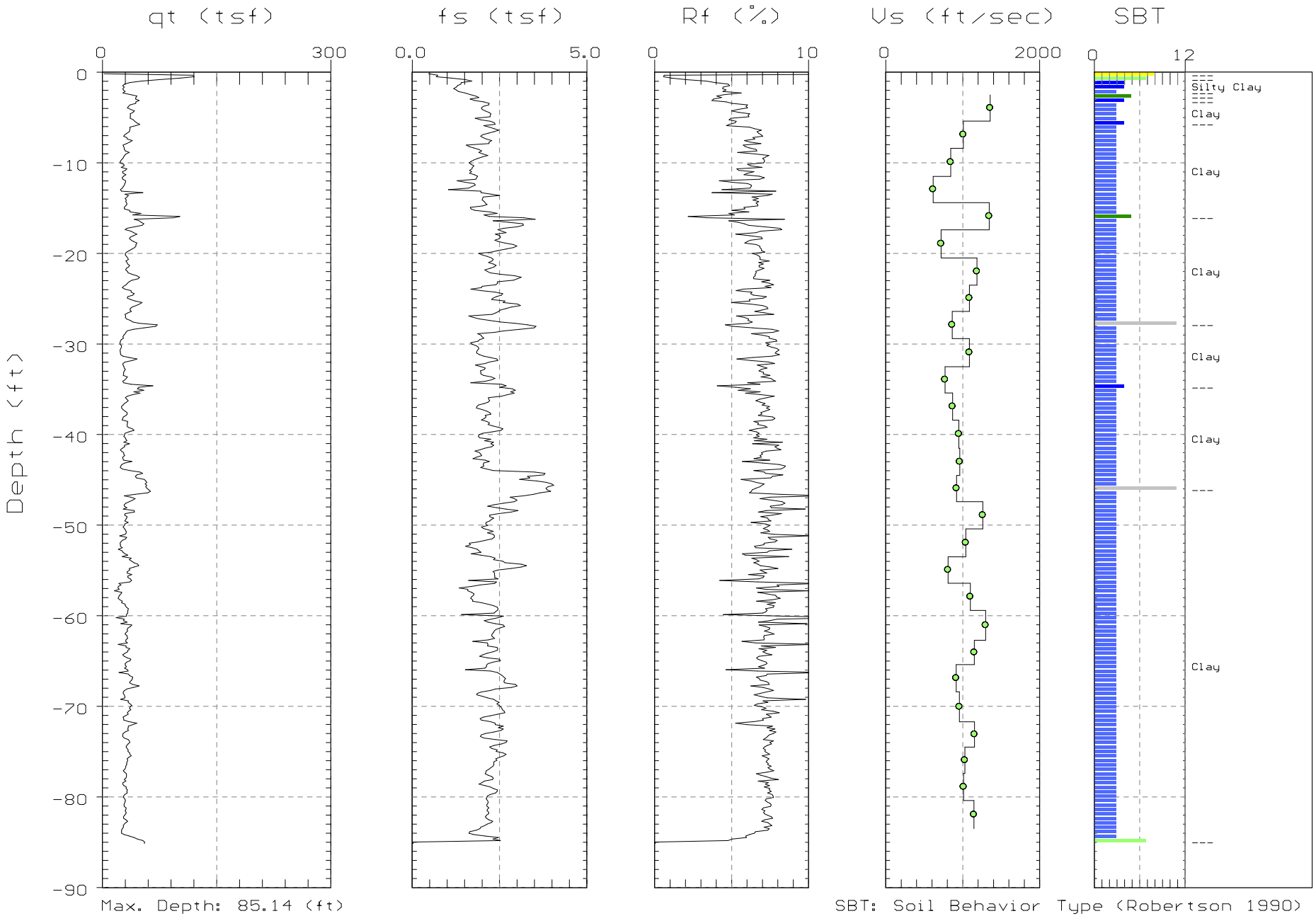
Max. Depth: 39.53 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

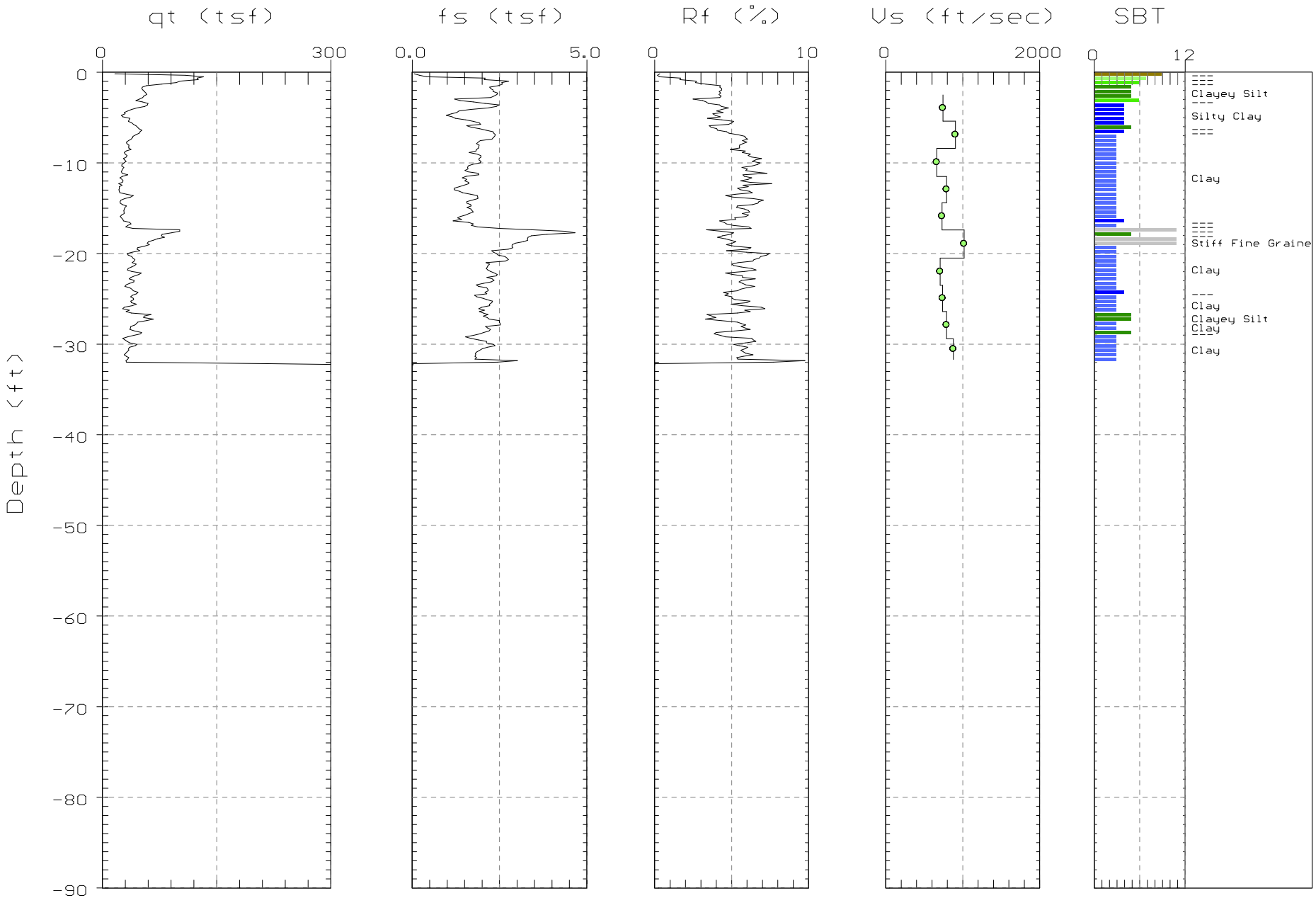
Site: N=1166860.56E=1844074.211 Engineer: C.SAMS
Location: CPT-1309L=591.0 Date: 05/14/06 10:04



GREGG

MACTEC

Site: N=1164809.635E=1847497.262 Engineer: C.SAMS
Location: CPT-1320L=604.9 Date: 08/20/06 08:56



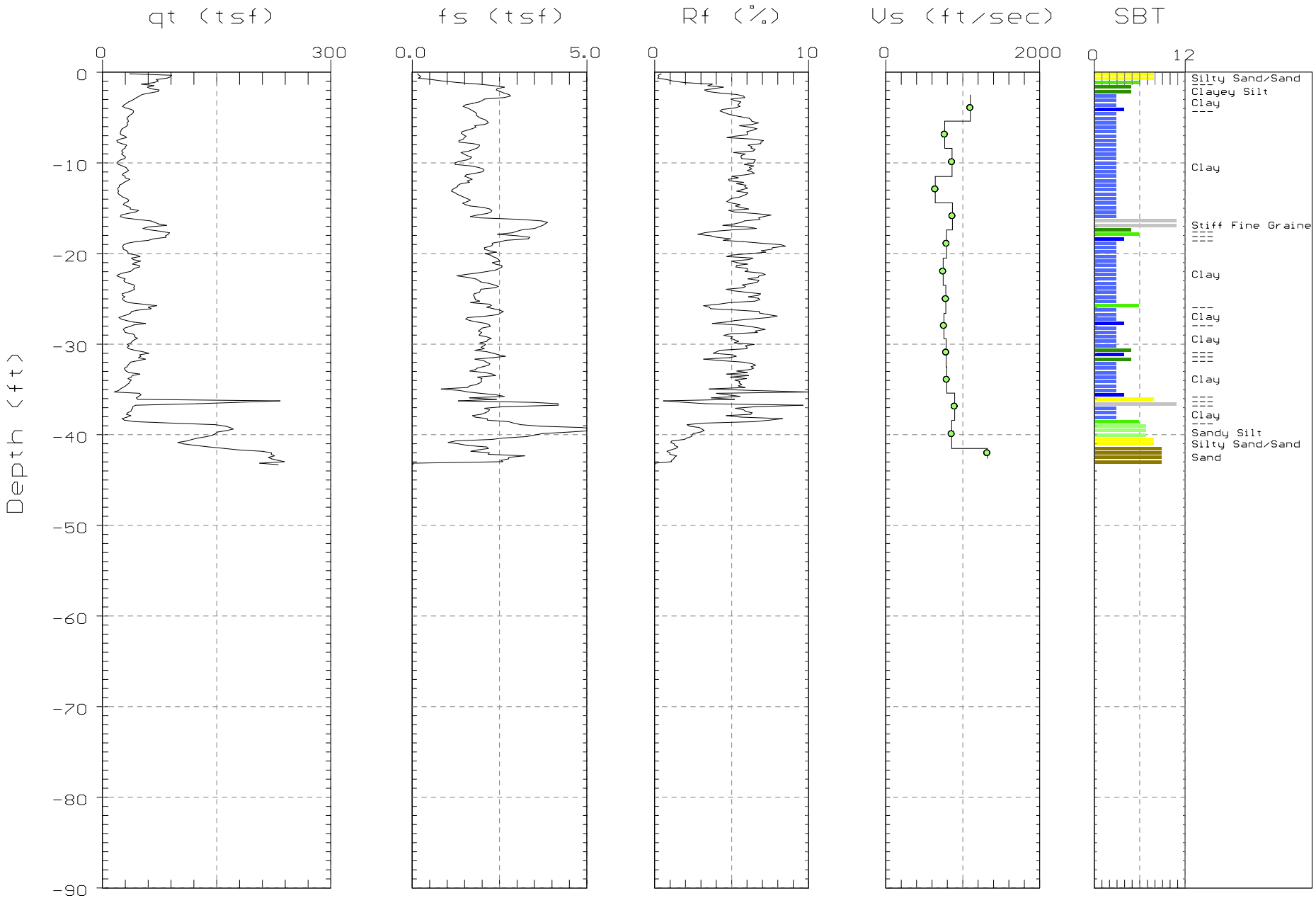
Max. Depth: 32.32 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164802.258E=1847460.695 Engineer: C.SAMS
Location: CPT-1321L=604.9 Date: 08/20/06 10:17



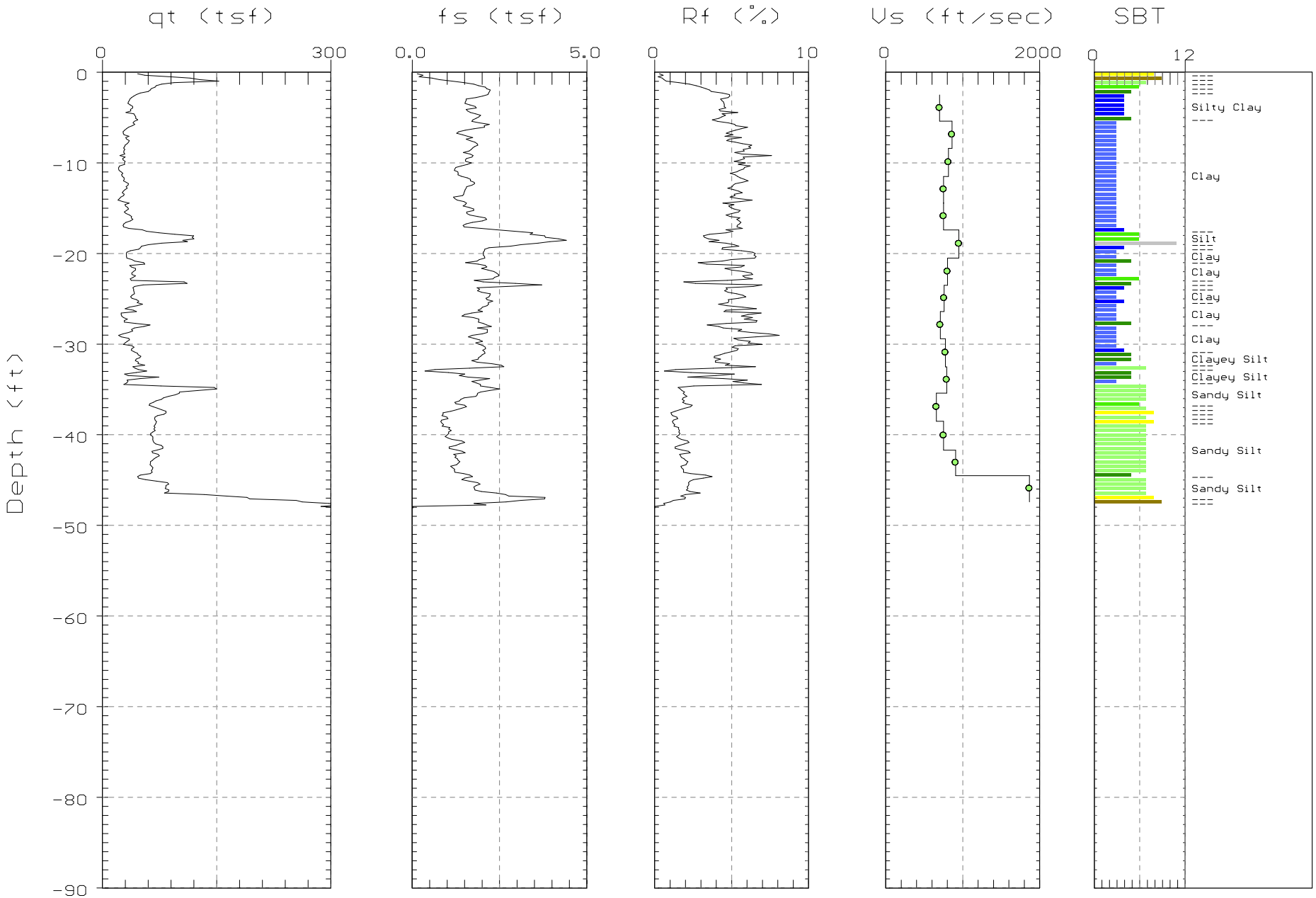
Max. Depth: 43.31 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1164794.98E=1847472.657 Engineer: C.SAMS
Location: CPT-1322L=605.2 Date: 08/20/06 07:01



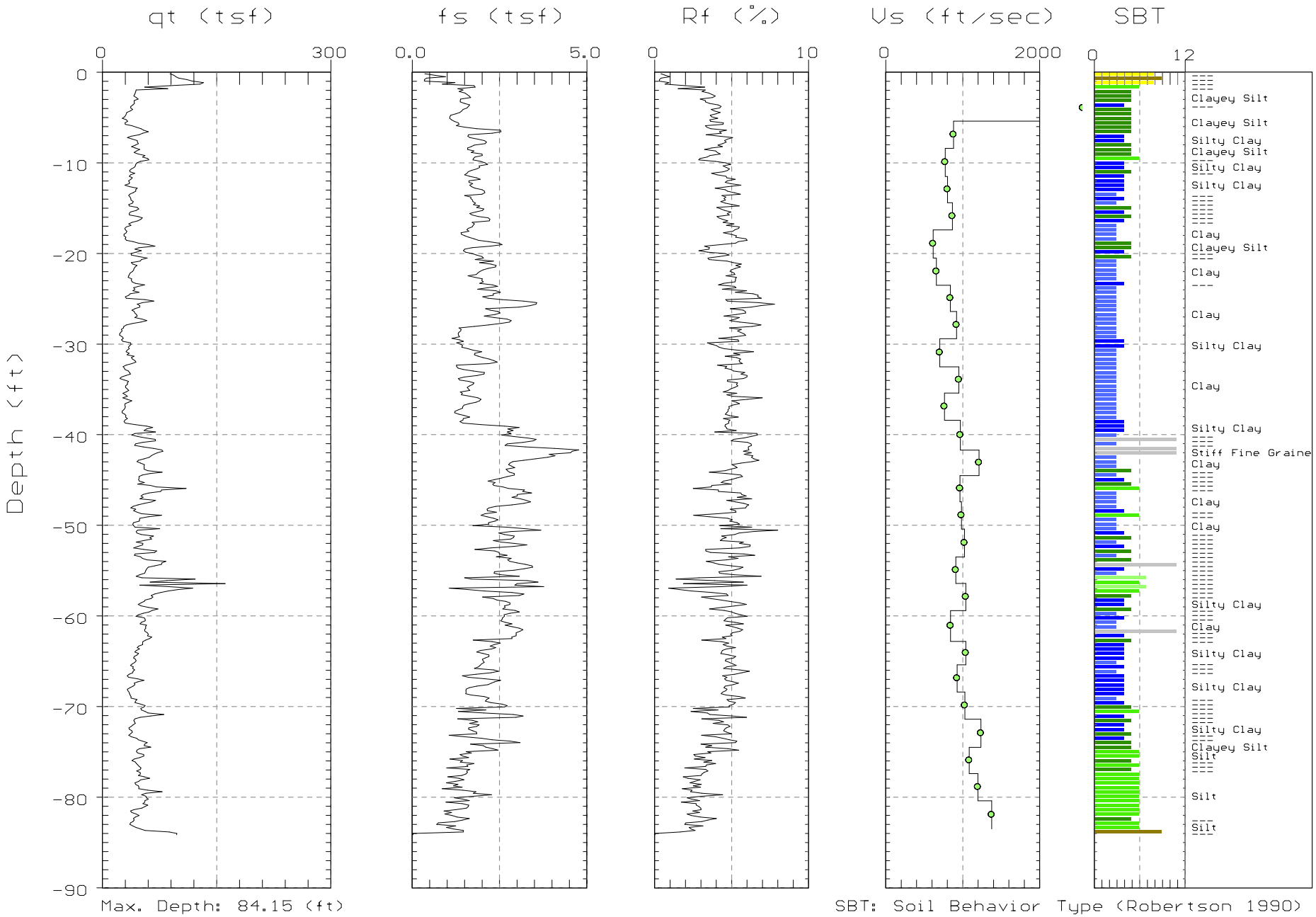
Max. Depth: 48.06 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165679.211E=1848305.418 Engineer: C.SAMS
Location: CPT-1323L=610.5 Date: 08/19/06 05:19



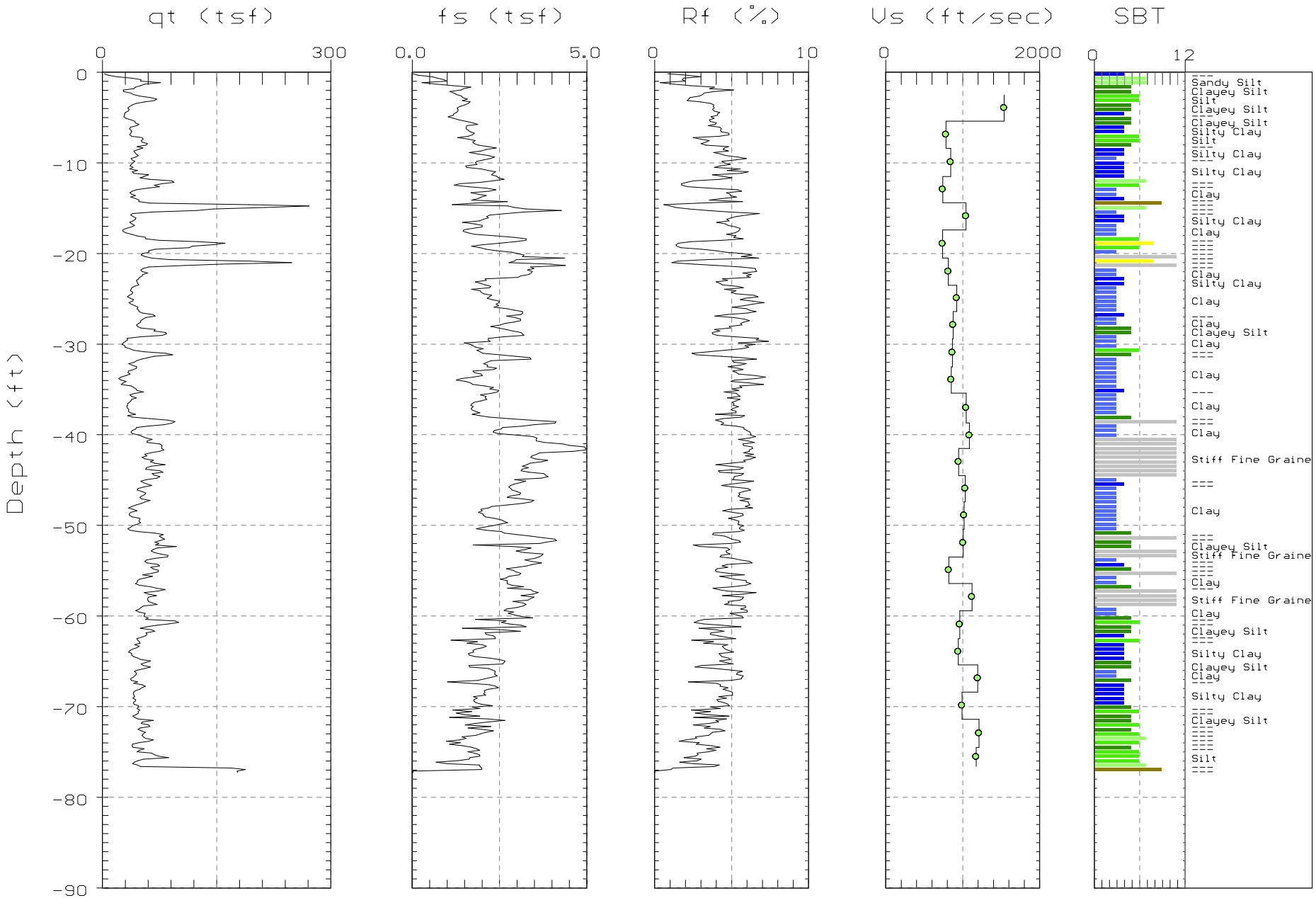
Max. Depth: 84.15 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165733.296E=1848334.24 Engineer: C.SAMS
Location: CPT-1324BL=610.2 Date: 08/19/06 09:02



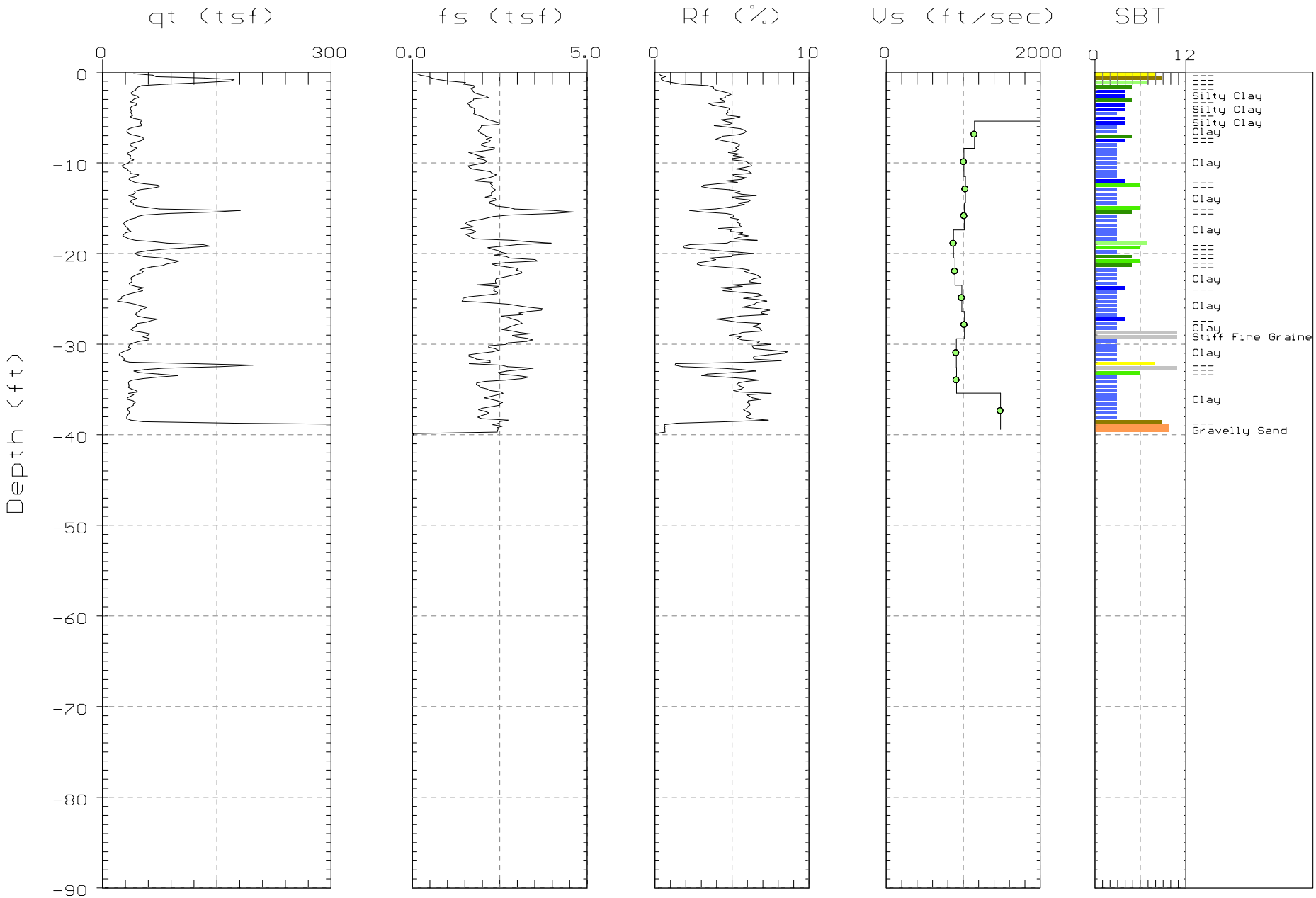
Max. Depth: 77.26 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165730.729E=1848273.937 Engineer: C.SAMS
Location: CPT-1325L=610.3 Date: 08/19/06 11:35



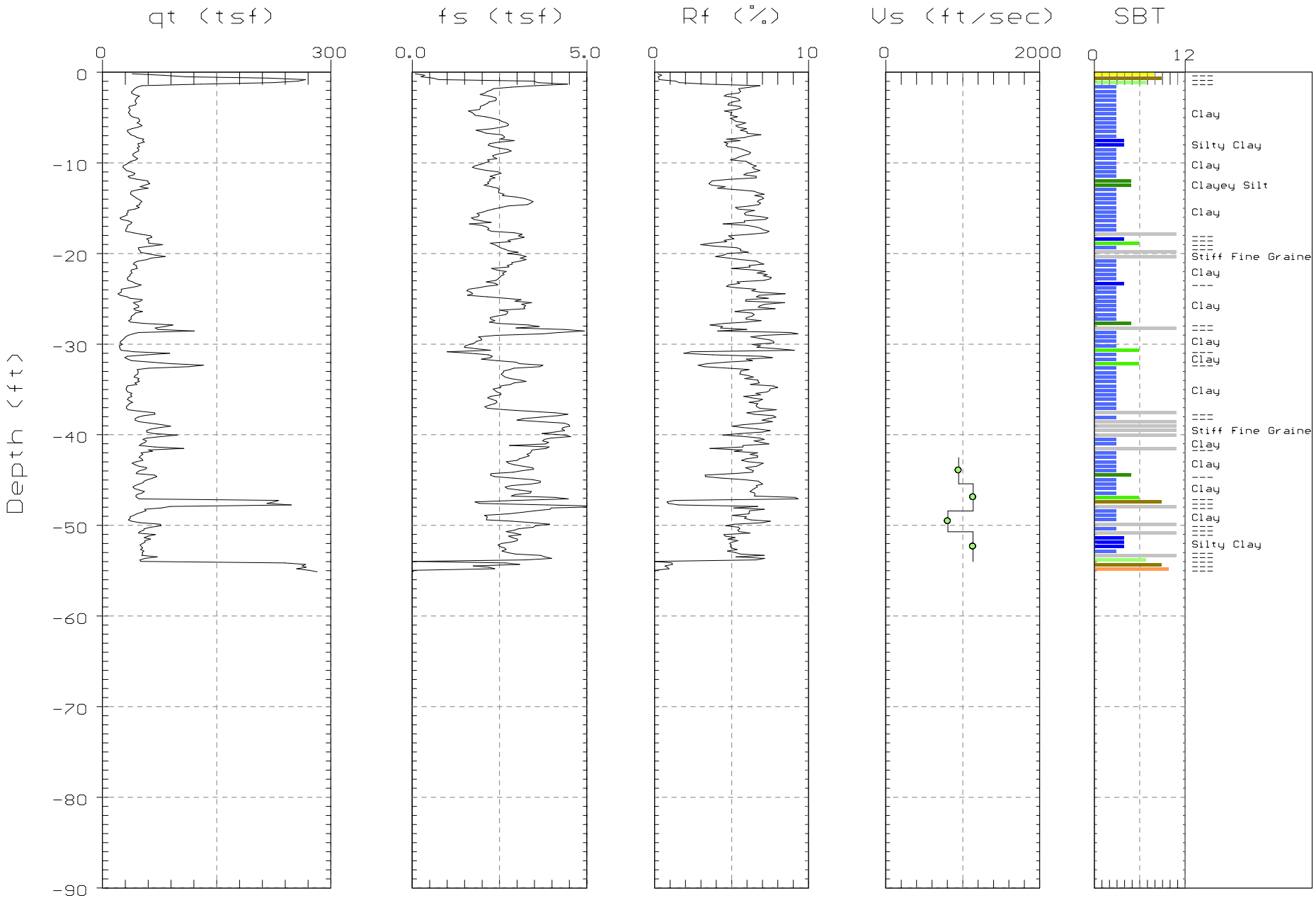
Max. Depth: 40.03 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MACTEC

Site: N=1165728.968E=1848272.952 Engineer: C.SAMS
Location: CPT-1325AL=610.1 Date: 08/19/06 12:39



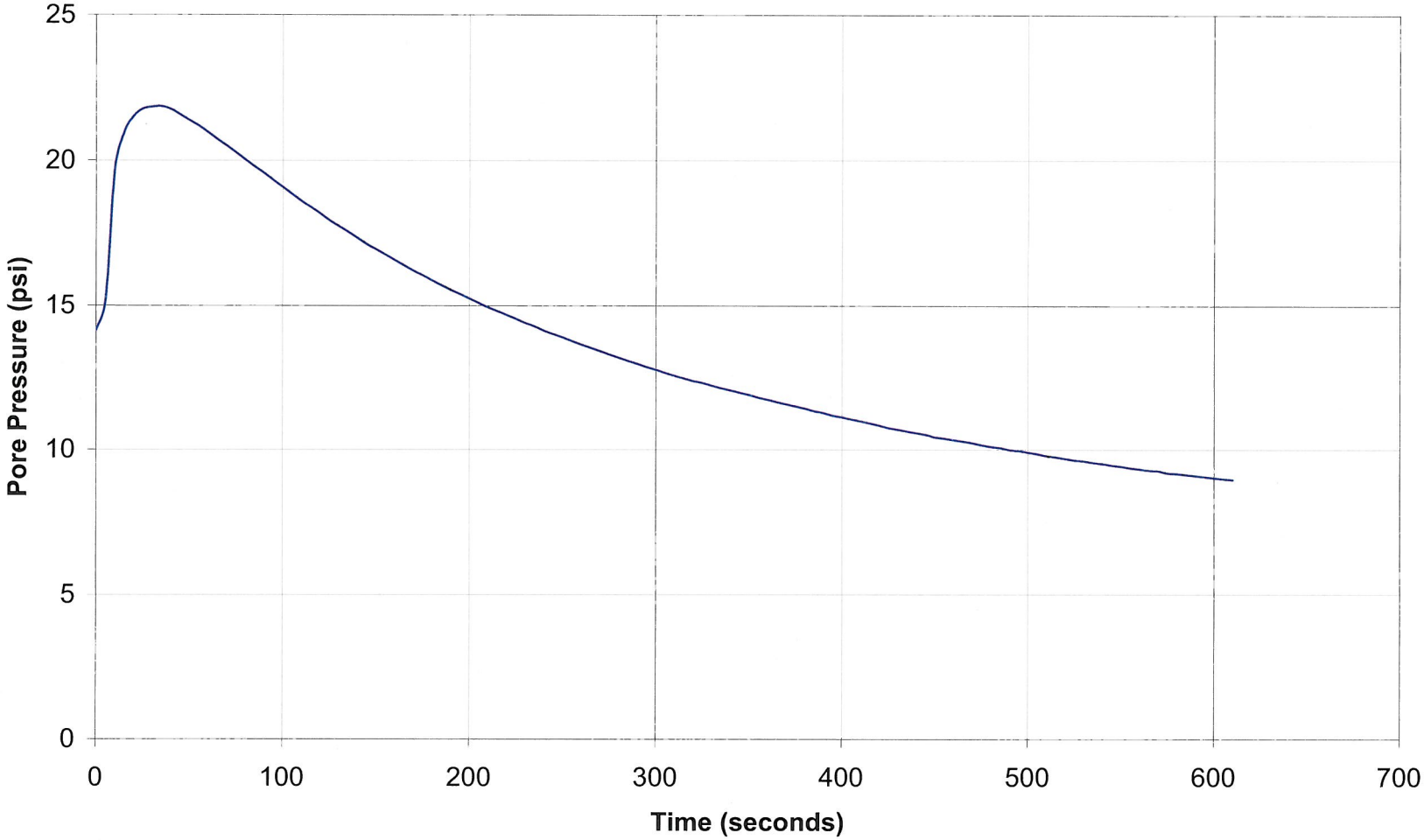
Max. Depth: 55.12 (ft)
Depth Inc.: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

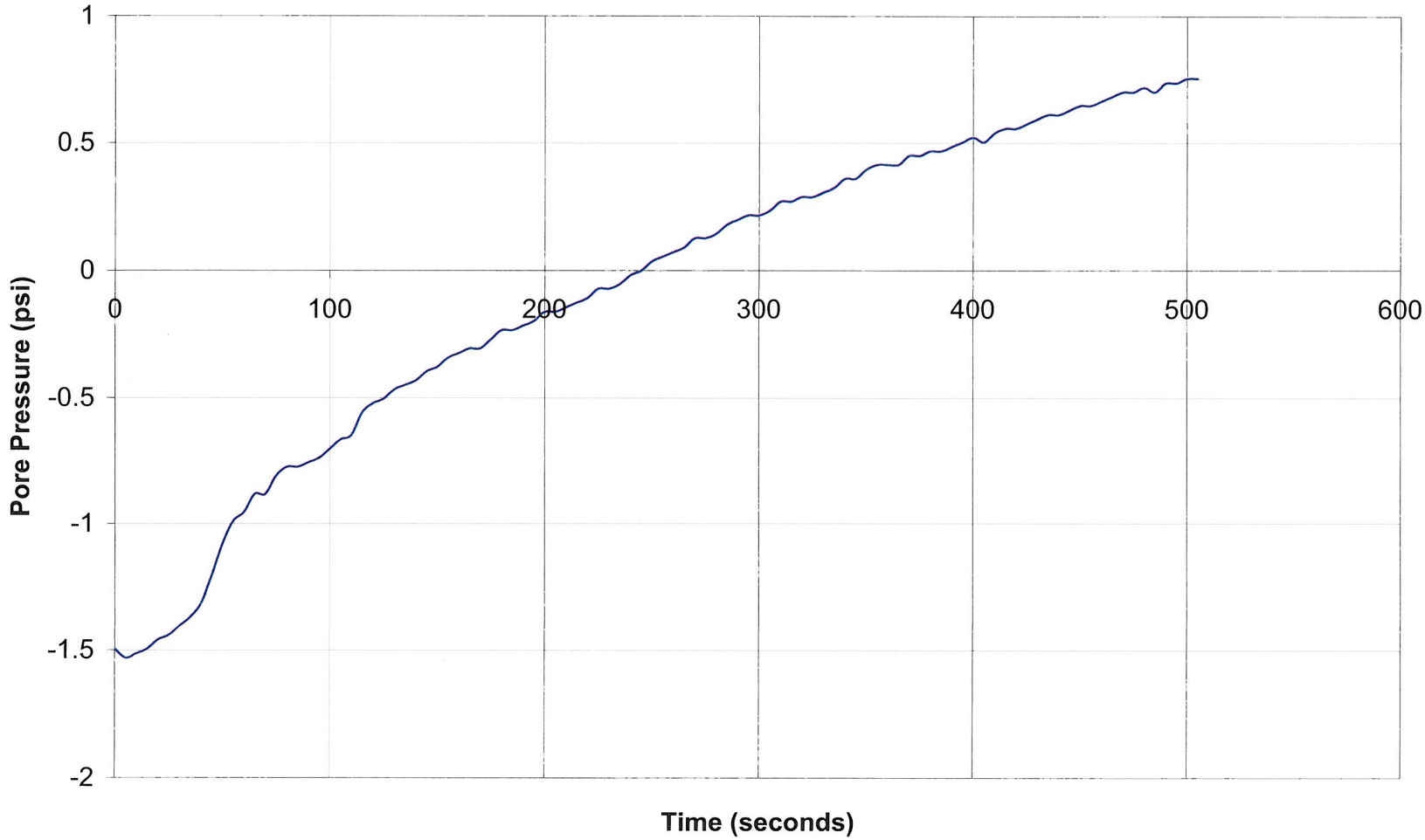
Sounding: cpt-1300
Depth: 18.537
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

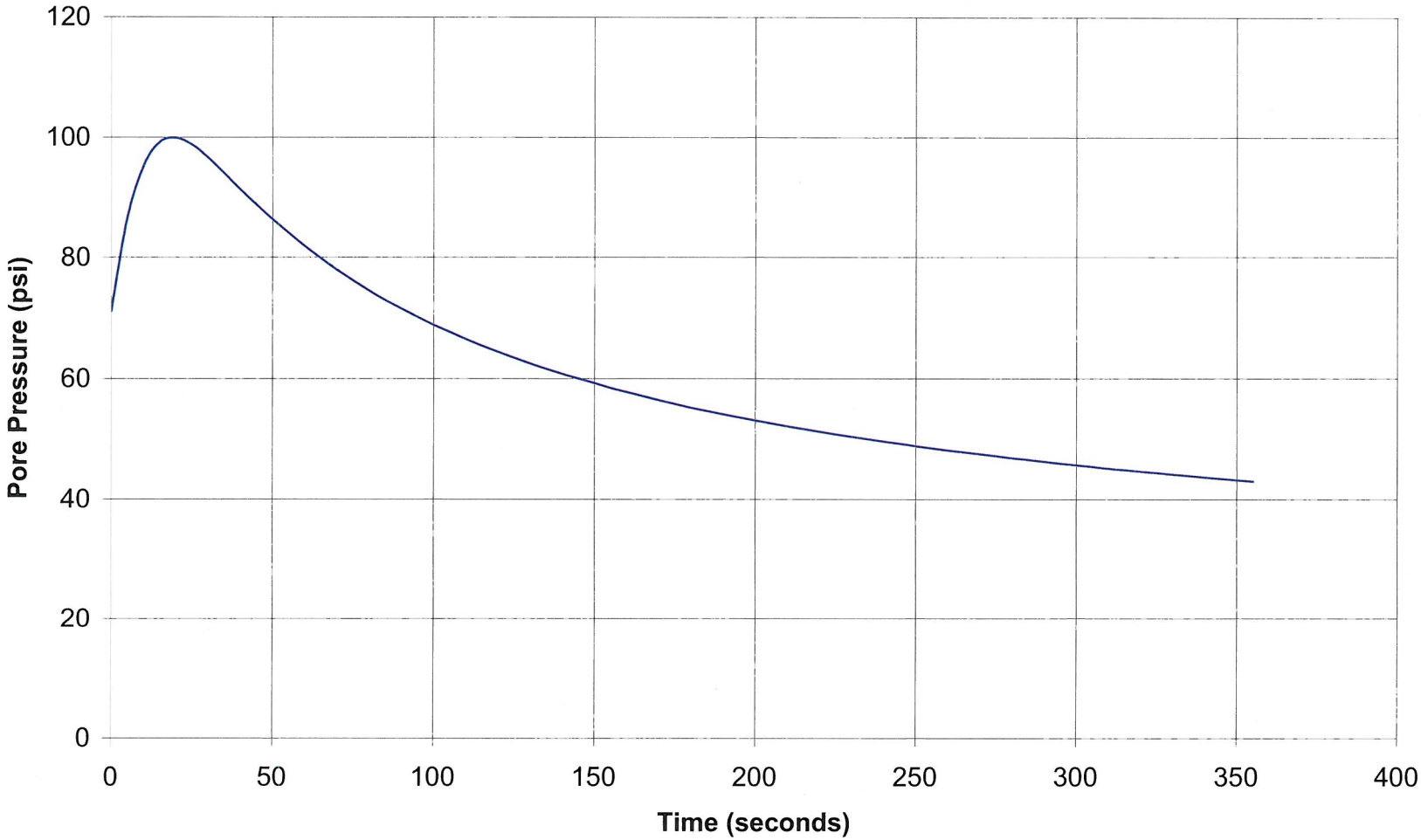
Sounding: cpt-1300
Depth: 30.02
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

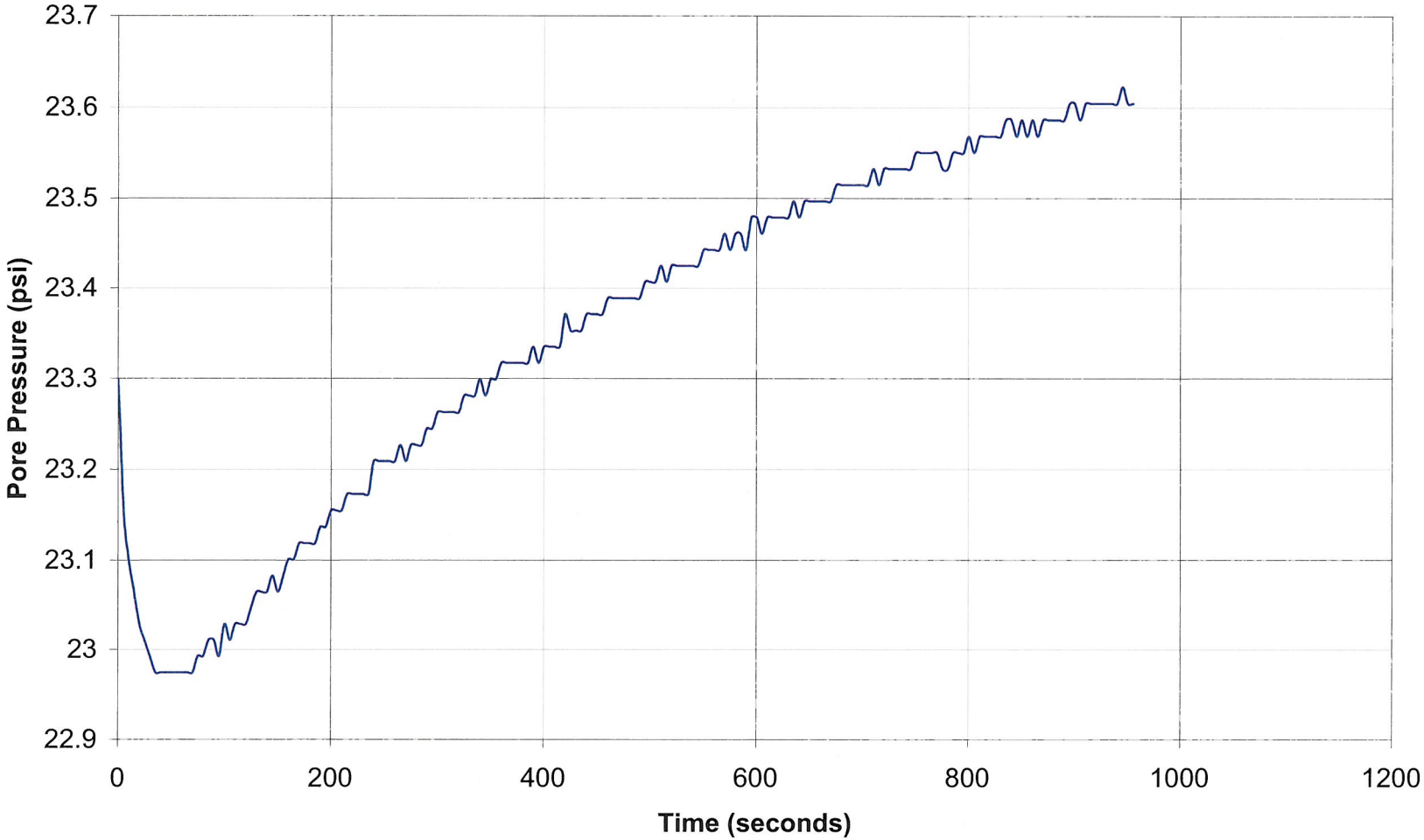
Sounding: cpt-1302
Depth: 34.941
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

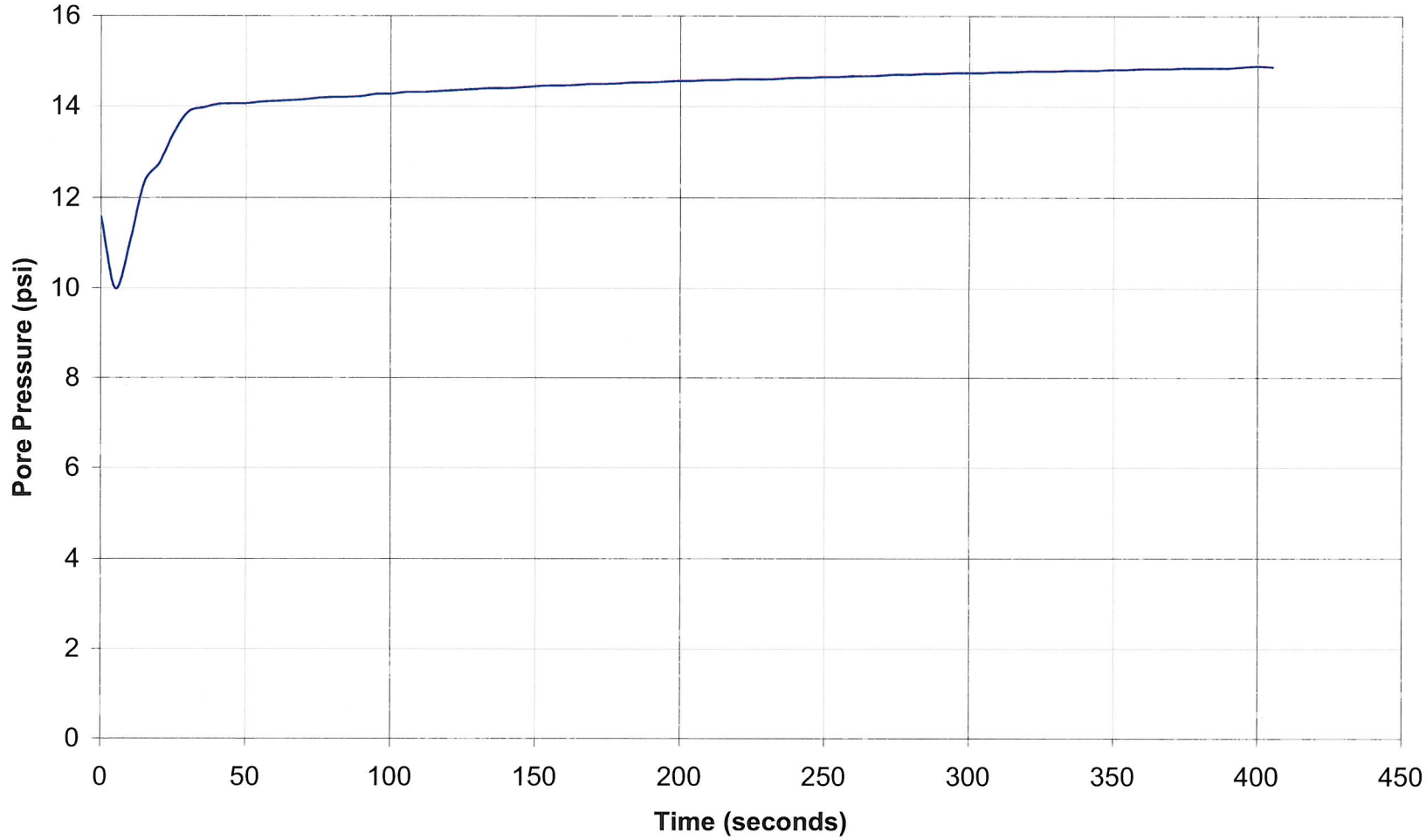
Sounding: cpt-1302
Depth: 80.052
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

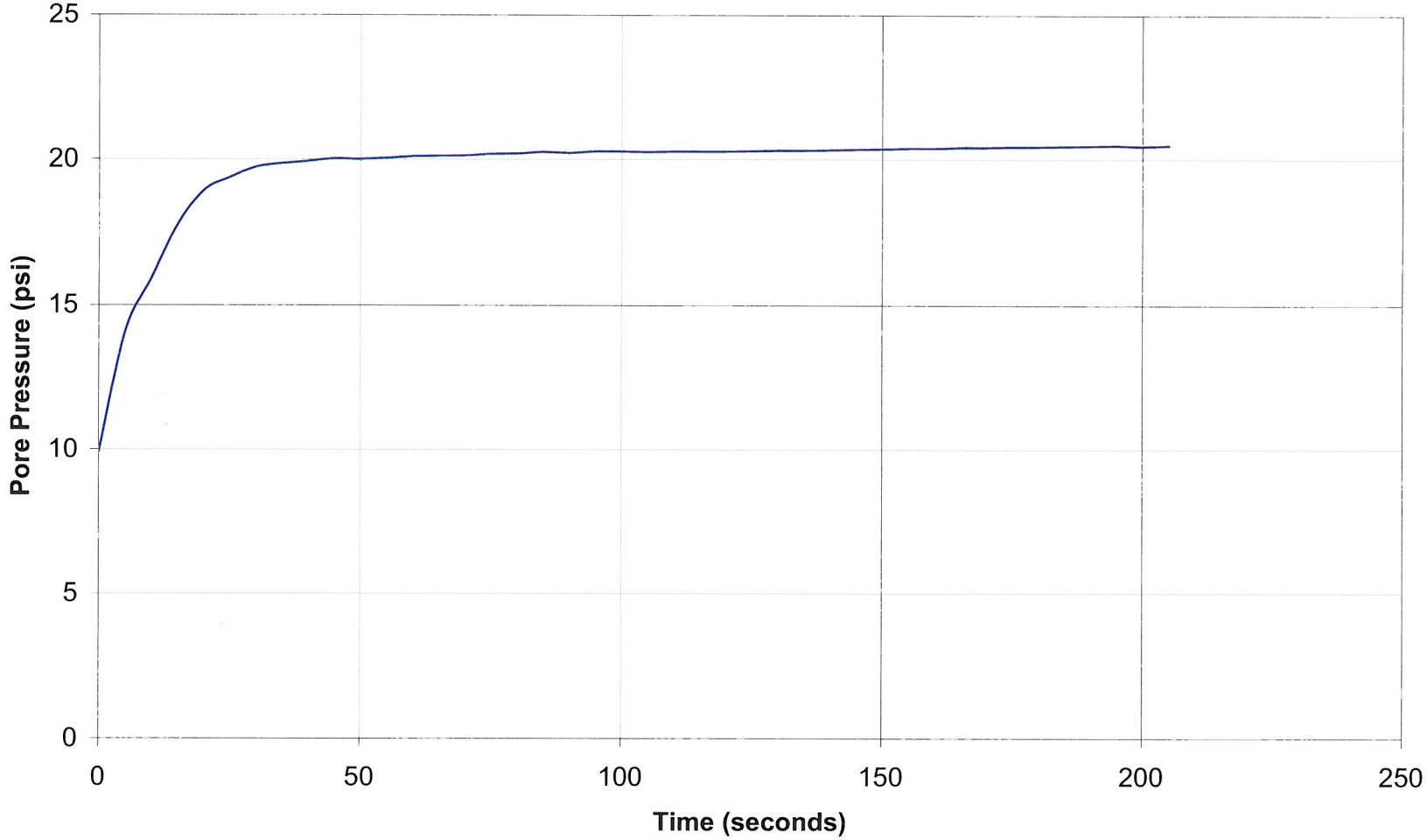
Sounding: cpt-1303
Depth: 65.945
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

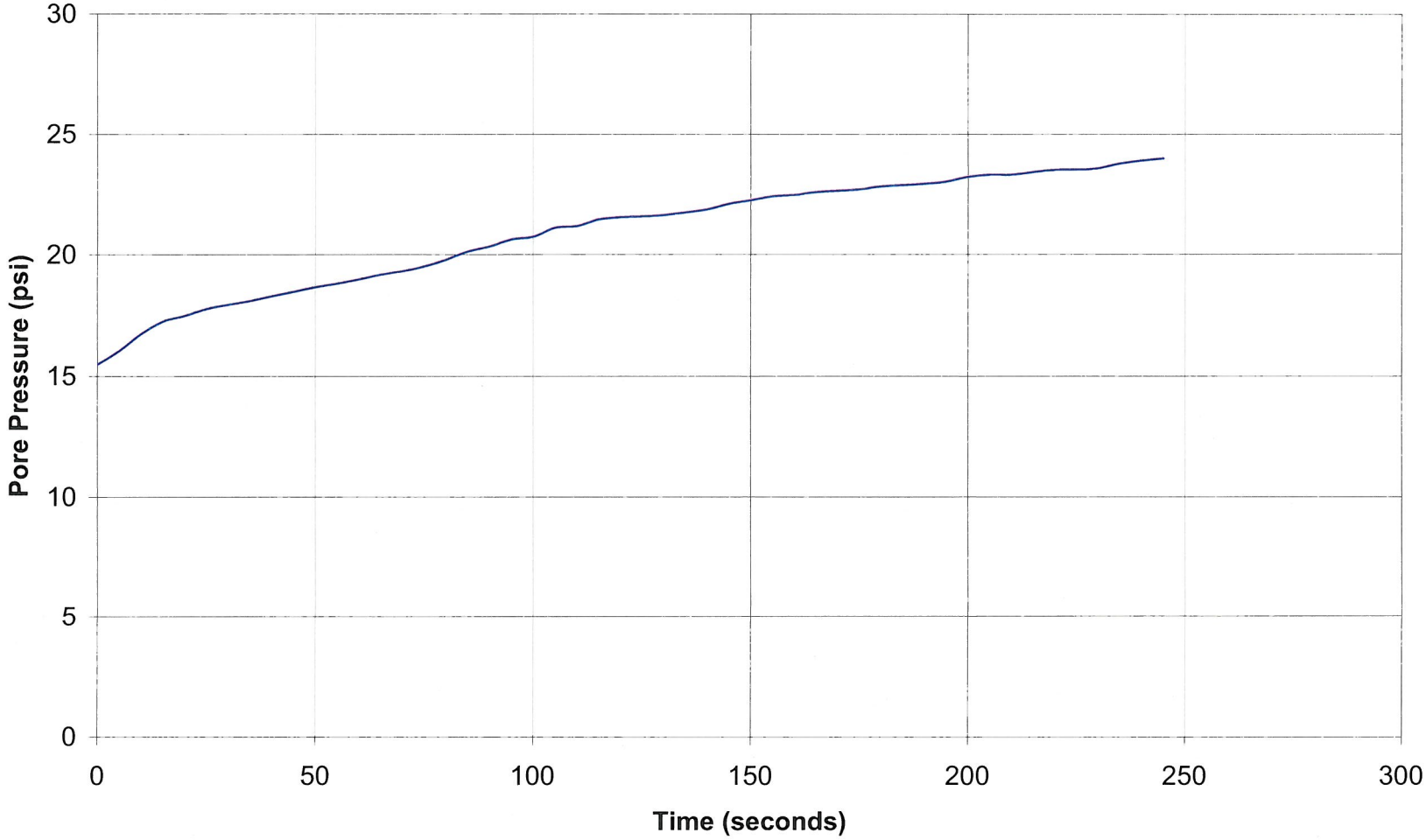
Sounding: cpt-1303
Depth: 80.216
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

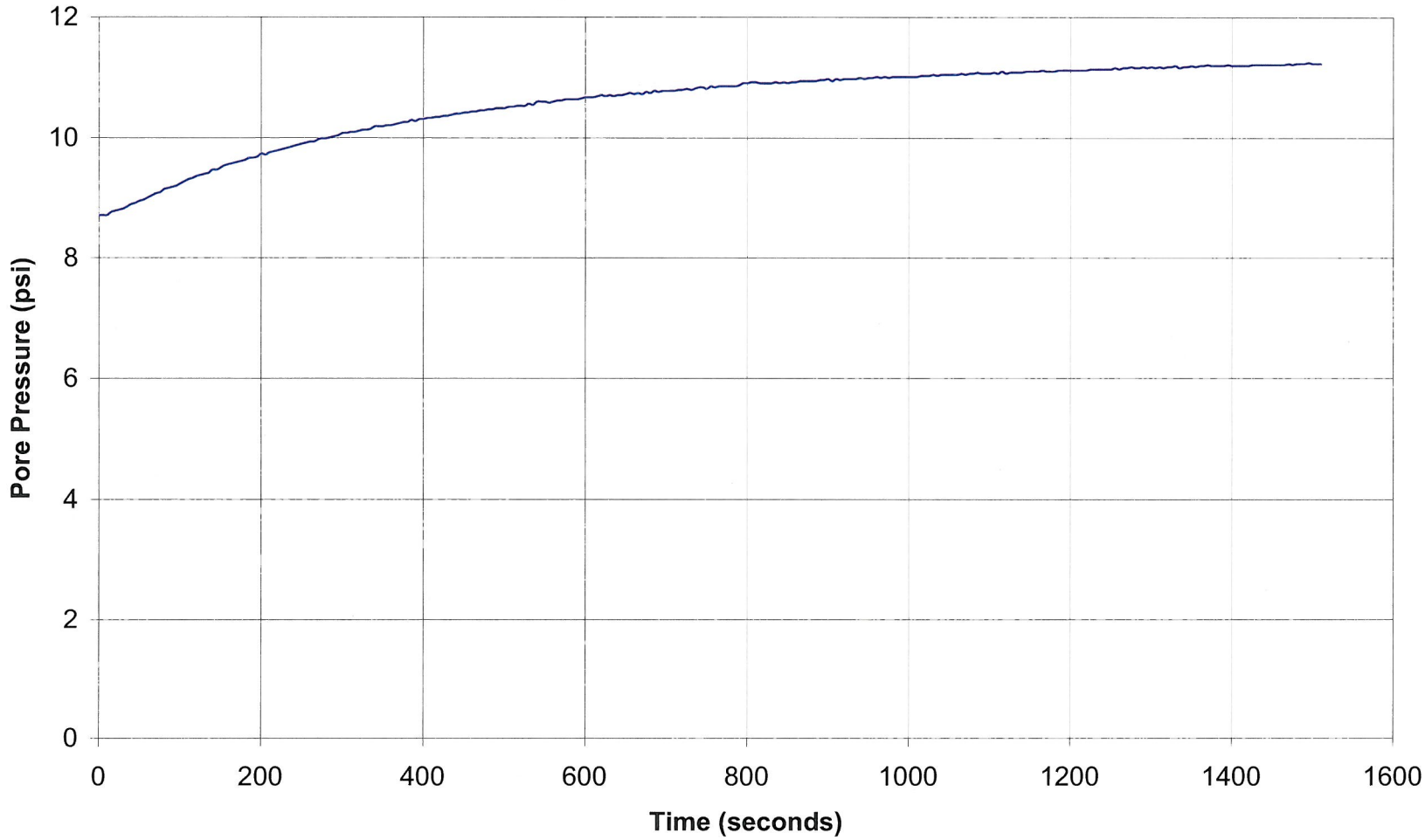
Sounding: cpt-1304
Depth: 73.983
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

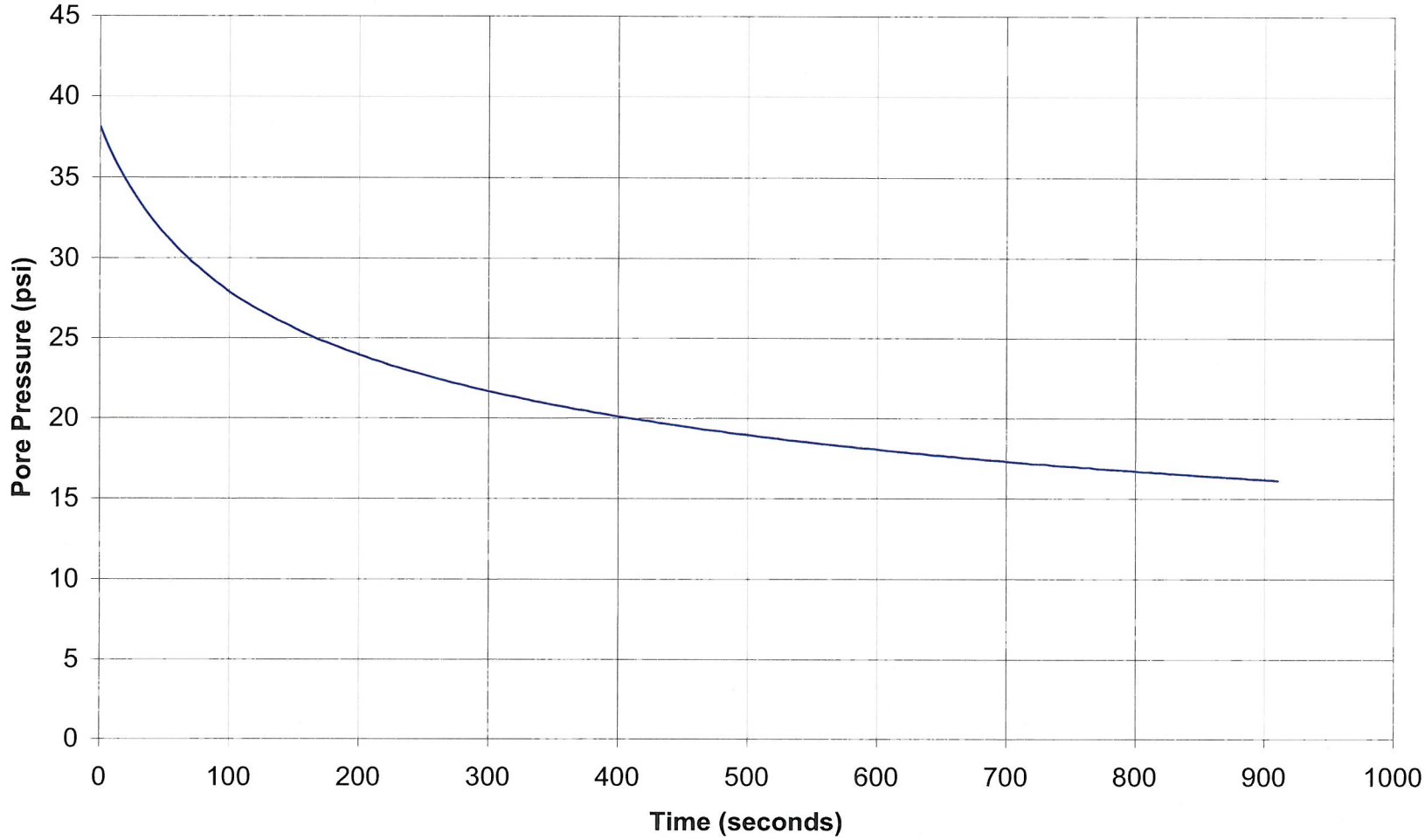
Sounding: cpt-1308a
Depth: 41.174
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

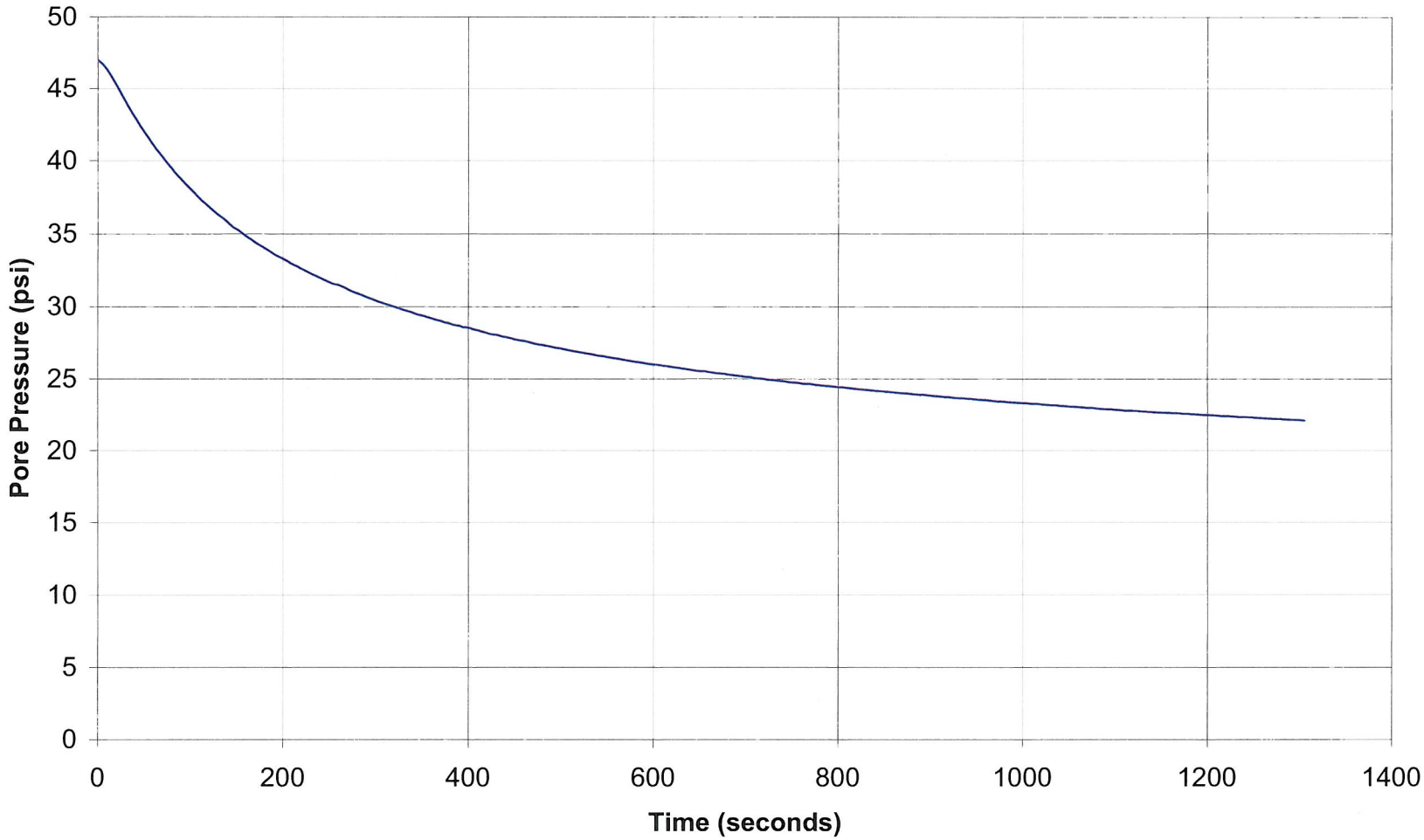
Sounding: cpt-1309
Depth: 60.039
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

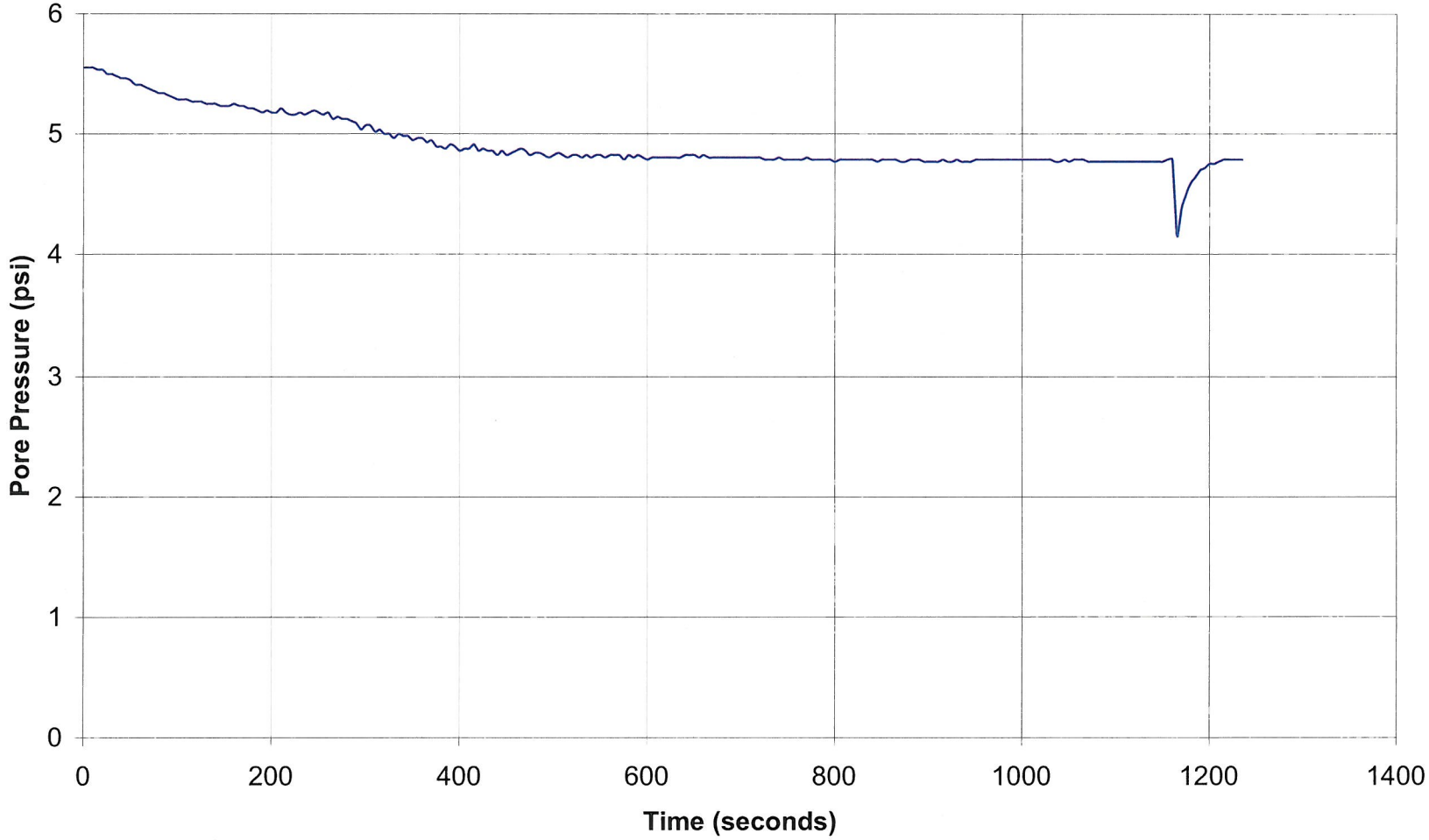
Sounding: cpt-1309
Depth: 85.138
Site: Duke Power
Engineer: C.Sams



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

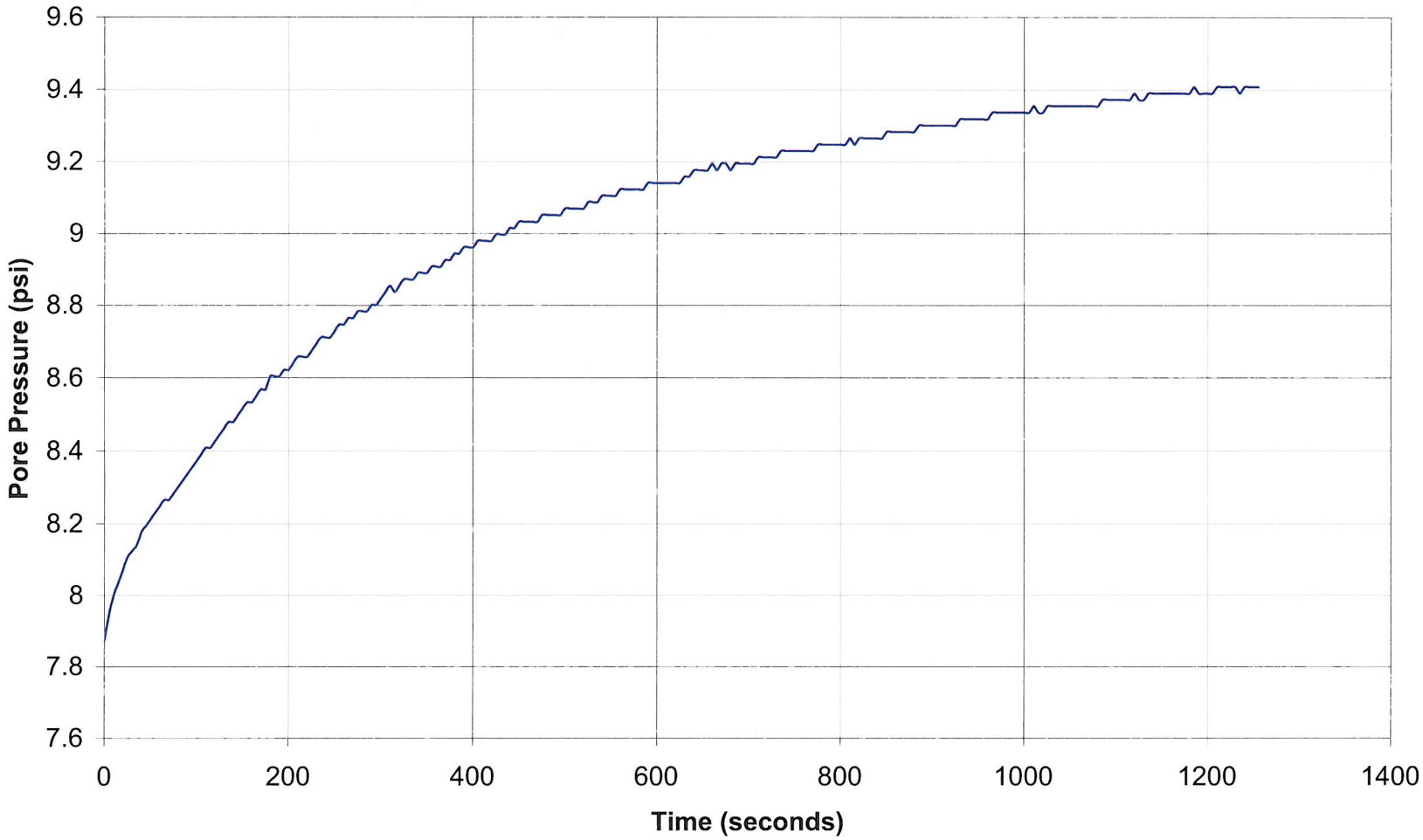
Sounding: cpt-1320
Depth: 32.316
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

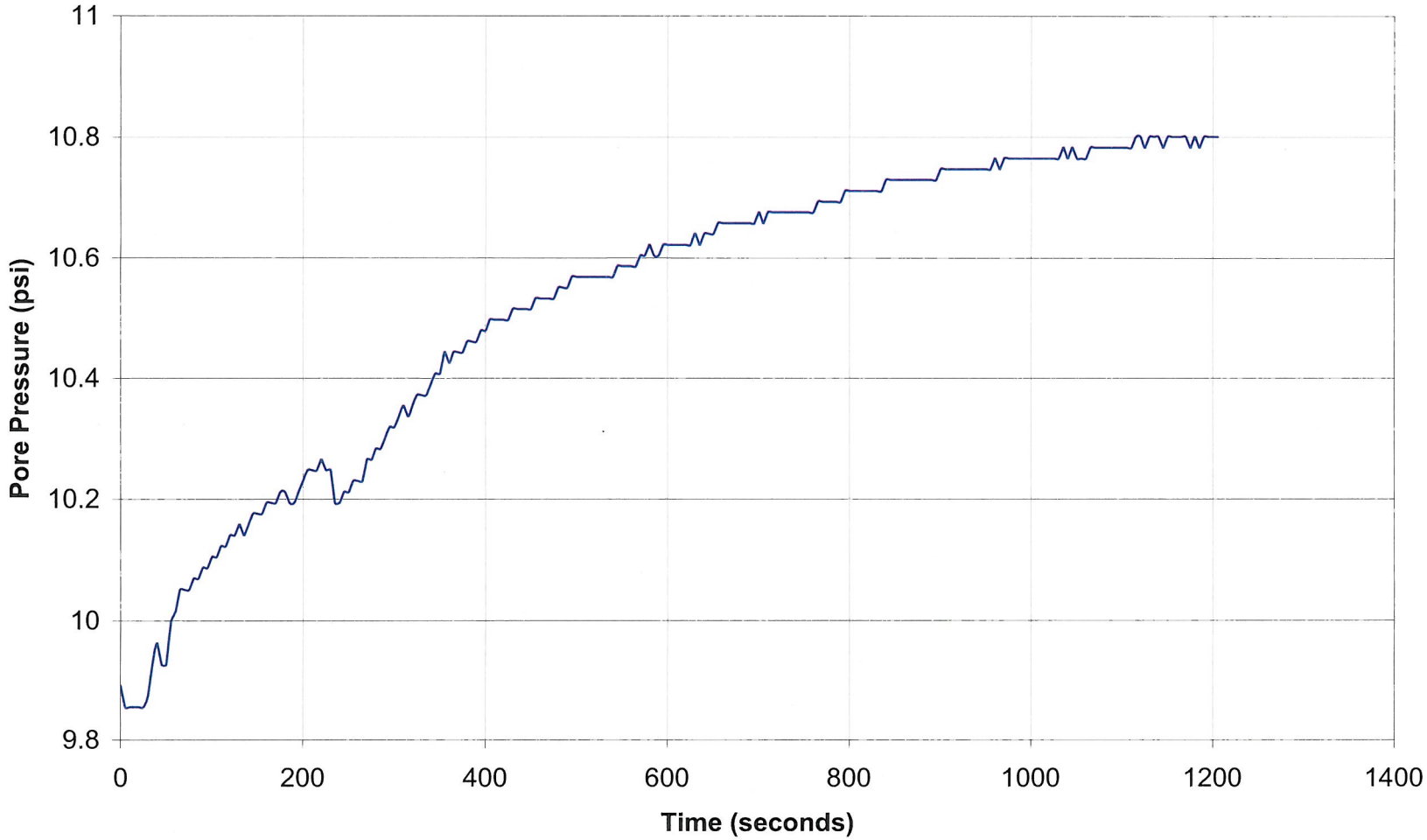
Sounding: cpt-1321
Depth: 43.307
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

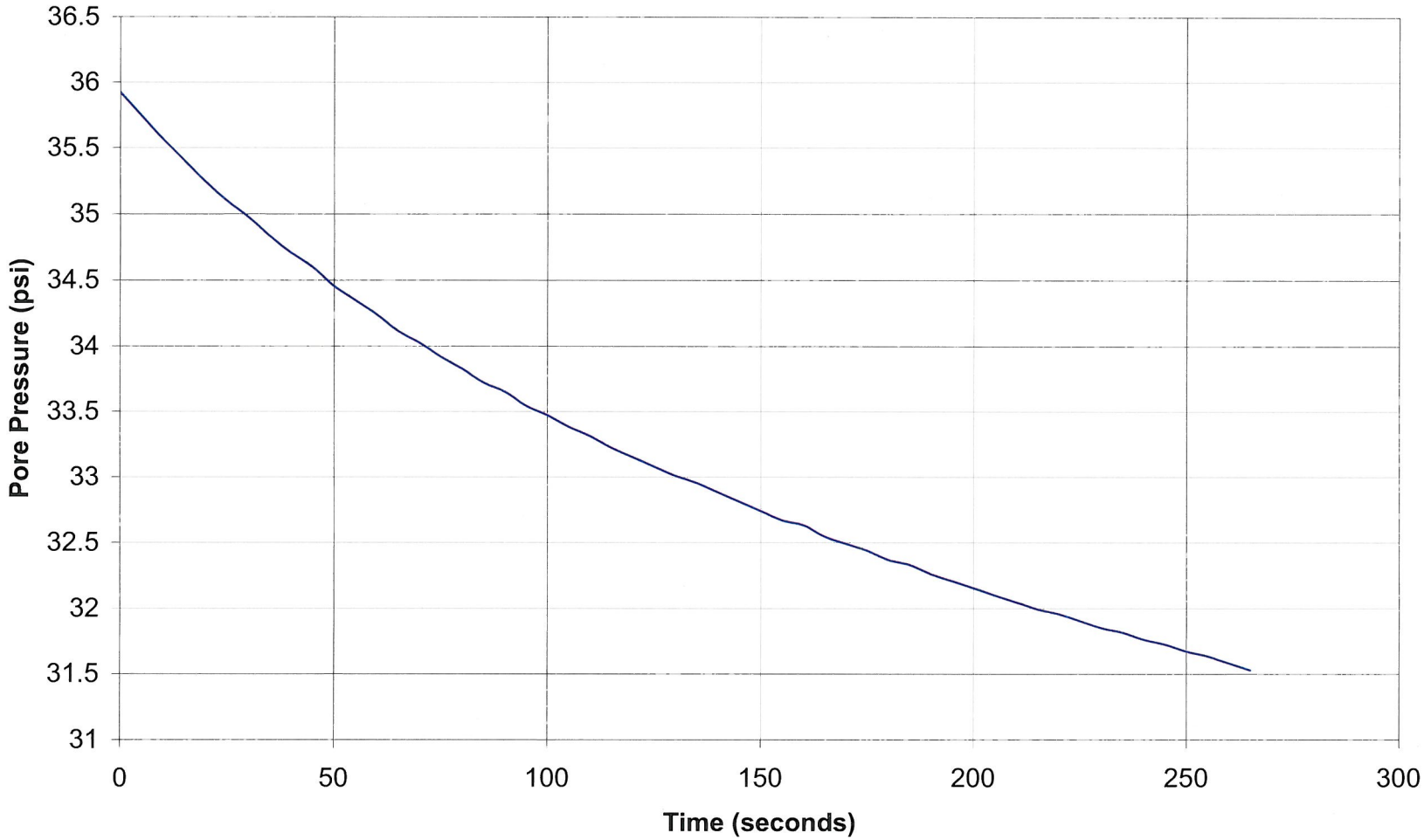
Sounding: cpt-1322
Depth: 48.064
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

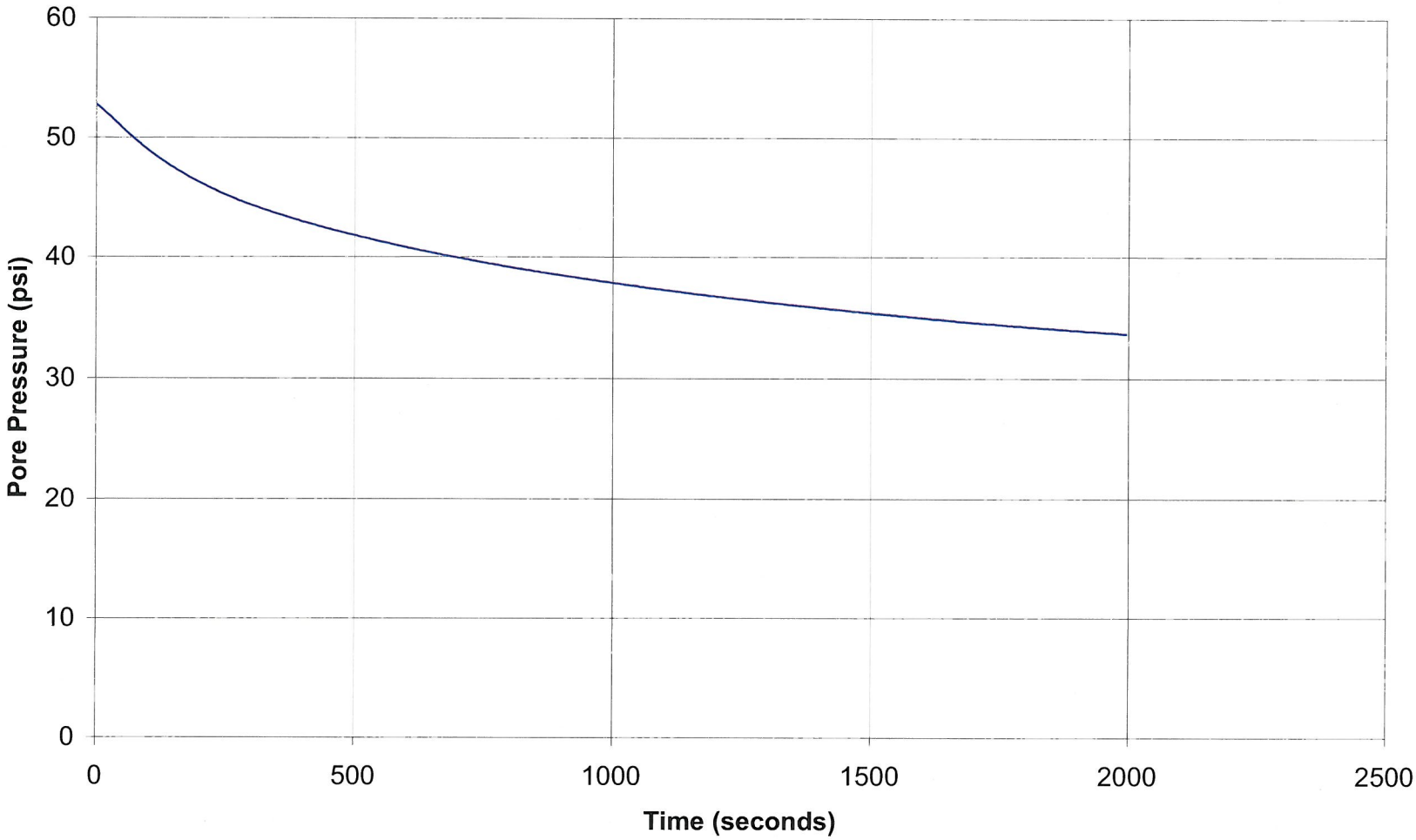
Sounding: cpt-1323
Depth: 81.037
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

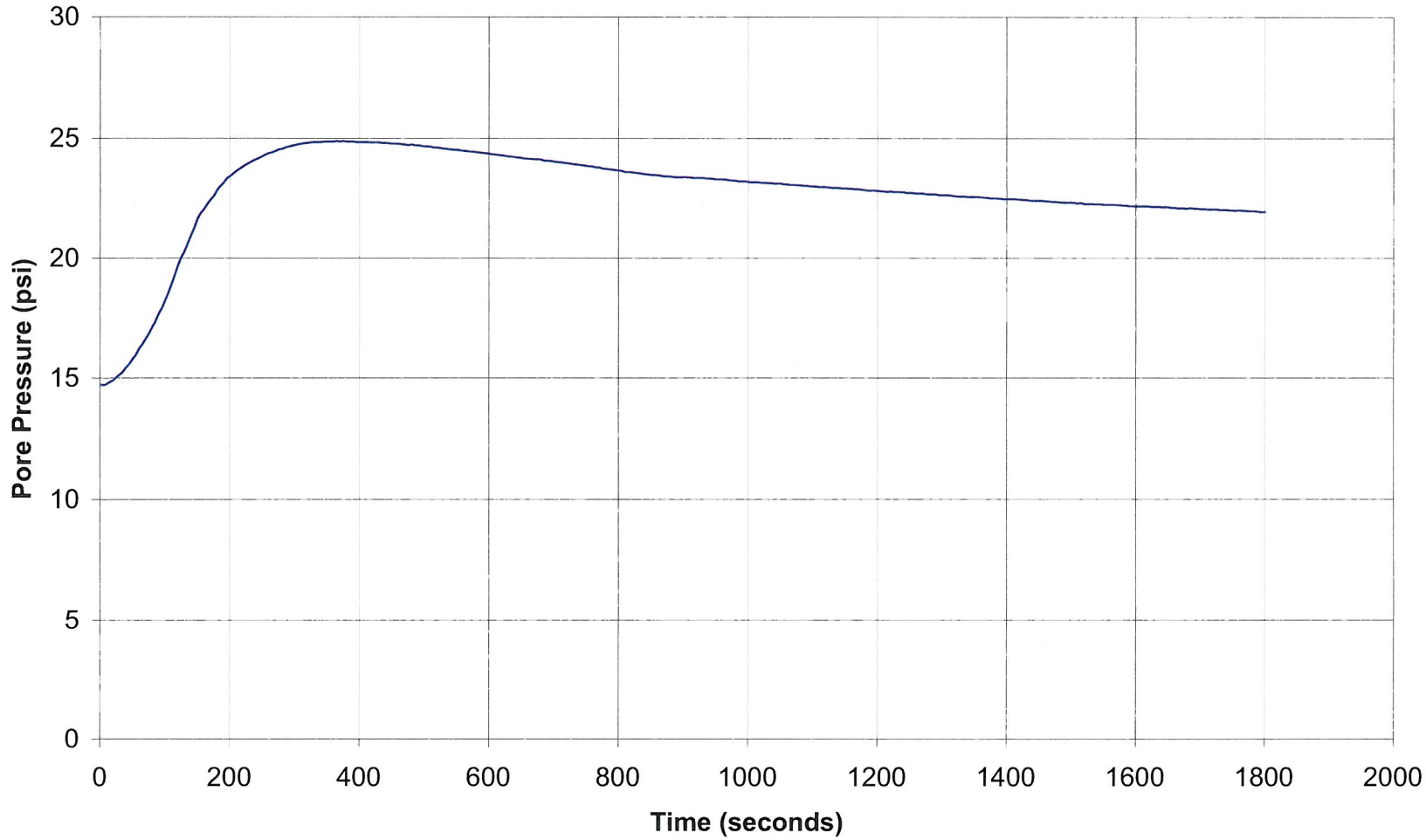
Sounding: cpt-1323
Depth: 84.153
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

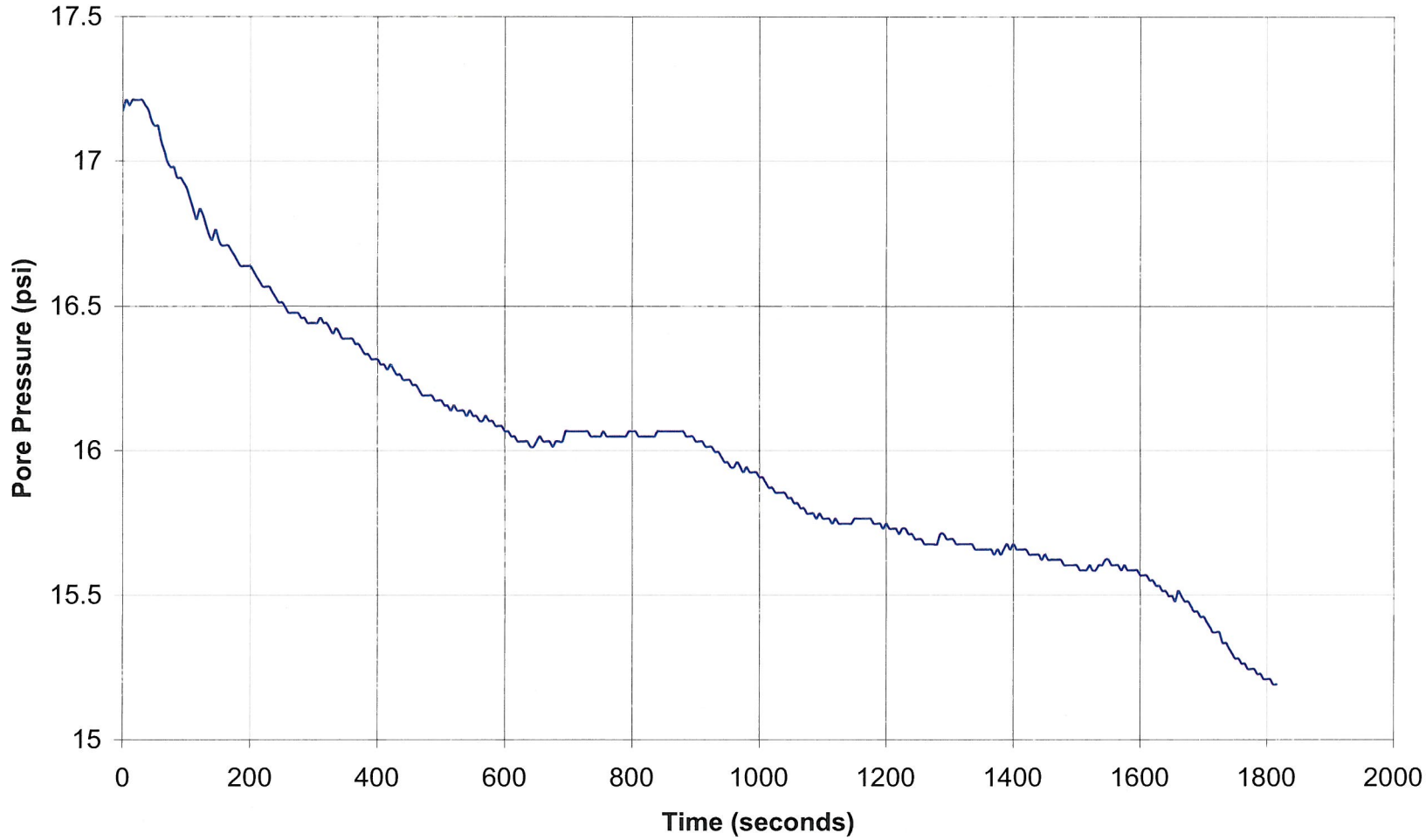
Sounding: cpt-1324b
Depth: 77.264
Site: DUKE POWER
Engineer: C.SAMS



GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt-1325a
Depth: 55.118
Site: DUKE POWER
Engineer: C.SAMS



Shear Wave Velocity Calculations

Duke Power/Cherokee
Mactec

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

5/16/2006 06-061sc
CPT-1308b

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49				
6.07	5.41	10.65	1.15	21.3500			3.93
9.02	8.36	12.41	1.76	22.5000	1.1500	1533.6	6.89
12.14	11.48	14.69	2.28	25.7500	3.2500	702.1	9.92
15.09	14.43	17.10	2.41	28.5000	2.7500	875.1	12.96
19.03	18.37	20.53	3.43	32.2000	3.7000	927.5	16.40
21.16	20.50	22.46	1.93	34.2500	2.0500	940.6	19.44
24.11	23.45	25.18	2.72	37.2500	3.0000	908.1	21.98
27.23	26.57	28.11	2.93	40.5500	3.3000	886.6	25.01
30.02	29.36	30.76	2.65	43.6000	3.0500	868.7	27.97
33.14	32.48	33.75	2.99	47.1000	3.5000	853.7	30.92
36.91	36.25	37.39	3.65	51.0500	3.9500	922.8	34.36

Shear Wave Velocity Calculations

Duke Power/Cherokee
Mactec

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

5/14/2006 06-061sc
CPT-1309

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	16.1500			
6.07	5.41	10.65	1.15	17.0000	0.8500	1356.8	3.93
9.02	8.36	12.41	1.76	18.7500	1.7500	1007.8	6.89
12.14	11.48	14.69	2.28	21.4500	2.7000	845.1	9.92
15.09	14.43	17.10	2.41	25.3500	3.9000	617.1	12.96
18.04	17.38	19.65	2.56	27.2500	1.9000	1345.3	15.91
21.16	20.50	22.46	2.80	31.1500	3.9000	718.9	18.94
24.11	23.45	25.18	2.72	33.4500	2.3000	1184.5	21.98
27.07	26.41	27.95	2.77	36.0000	2.5500	1086.6	24.93
30.02	29.36	30.76	2.80	39.2500	3.2500	863.0	27.88
33.14	32.48	33.75	2.99	42.0000	2.7500	1086.5	30.92
36.09	35.43	36.60	2.85	45.7000	3.7000	770.4	33.95
39.04	38.38	39.46	2.87	49.0000	3.3000	868.3	36.91
42.16	41.50	42.50	3.04	52.2000	3.2000	949.3	39.94
45.11	44.45	45.39	2.89	55.2000	3.0000	962.6	42.98
48.06	47.40	48.28	2.90	58.3500	3.1500	919.2	45.93
51.02	50.36	51.19	2.90	60.6500	2.3000	1261.8	48.88
54.13	53.47	54.25	3.07	63.6000	2.9500	1040.4	51.92
57.09	56.43	57.17	2.91	67.2000	3.6000	809.0	54.95
60.04	59.38	60.08	2.92	69.8500	2.6500	1100.5	57.90
63.32	62.66	63.33	3.24	72.3500	2.5000	1297.7	61.02
66.11	65.45	66.09	2.76	74.7500	2.4000	1150.2	64.05
69.06	68.40	69.01	2.93	77.9500	3.2000	914.2	66.93
72.34	71.68	72.27	3.25	81.3500	3.4000	956.8	70.04
75.13	74.47	75.03	2.77	83.7500	2.4000	1152.9	73.08
78.08	77.42	77.96	2.93	86.6000	2.8500	1028.6	75.95
81.04	80.38	80.90	2.93	89.5000	2.9000	1011.4	78.90
84.15	83.49	84.00	3.10	92.2000	2.7000	1147.2	81.93

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

06-094sc
cpt-1320

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	15.9000			
6.07	5.41	10.65	1.15	17.4500	1.5500	744.1	3.93
9.02	8.36	12.41	1.76	19.4000	1.9500	904.4	6.89
12.14	11.48	14.69	2.28	22.8500	3.4500	661.4	9.92
15.09	14.43	17.10	2.41	25.9000	3.0500	789.1	12.96
18.04	17.38	19.65	2.56	29.4000	3.5000	730.3	15.91
21.16	20.50	22.46	2.80	32.1500	2.7500	1019.6	18.94
24.11	23.45	25.18	2.72	36.0000	3.8500	707.6	21.98
27.07	26.41	27.95	2.77	39.7500	3.7500	738.9	24.93
30.02	29.36	30.76	2.80	43.3000	3.5500	790.0	27.88
32.32	31.66	32.96	2.20	45.8000	2.5000	879.7	30.51

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

06-094sc
cpt-1321

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	17.9000			
6.07	5.41	10.65	1.15	18.9500	1.0500	1098.4	3.93
9.02	8.36	12.41	1.76	21.2500	2.3000	766.8	6.89
12.14	11.48	14.69	2.28	23.9000	2.6500	861.0	9.92
15.09	14.43	17.10	2.41	27.6500	3.7500	641.8	12.96
18.04	17.38	19.65	2.56	30.6000	2.9500	866.5	15.91
21.16	20.50	22.46	2.80	34.1500	3.5500	789.8	18.94
24.11	23.45	25.18	2.72	37.8000	3.6500	746.4	21.98
27.23	26.57	28.11	2.93	41.5500	3.7500	780.2	25.01
30.02	29.36	30.76	2.65	45.0500	3.5000	757.0	27.97
33.14	32.48	33.75	2.99	48.8500	3.8000	786.3	30.92
36.09	35.43	36.60	2.85	52.4500	3.6000	791.8	33.95
39.04	38.38	39.46	2.87	55.6500	3.2000	895.5	36.91
42.16	41.50	42.50	3.04	59.2000	3.5500	855.7	39.94
43.31	42.65	43.62	1.12	60.0500	0.8500	1319.9	42.07

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

06-094sc
cpt-1322

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	15.9500			
6.07	5.41	10.65	1.15	17.6000	1.6500	699.0	3.93
9.02	8.36	12.41	1.76	19.6500	2.0500	860.3	6.89
12.14	11.48	14.69	2.28	22.4500	2.8000	814.9	9.92
15.09	14.43	17.10	2.41	25.6500	3.2000	752.1	12.96
18.04	17.38	19.65	2.56	29.0500	3.4000	751.8	15.91
21.16	20.50	22.46	2.80	32.0000	2.9500	950.5	18.94
24.11	23.45	25.18	2.72	35.4000	3.4000	801.3	21.98
27.07	26.41	27.95	2.77	39.0500	3.6500	759.1	24.93
30.02	29.36	30.76	2.80	43.0000	3.9500	710.0	27.88
33.14	32.48	33.75	2.99	46.8500	3.8500	776.1	30.92
36.09	35.43	36.60	2.85	50.4500	3.6000	791.8	33.95
39.21	38.55	39.62	3.03	55.0500	4.6000	657.6	36.99
42.32	41.66	42.66	3.04	59.1000	4.0500	750.2	40.10
45.11	44.45	45.39	2.73	62.1000	3.0000	909.2	43.06
48.06	47.40	48.28	2.90	63.6500	1.5500	1868.1	45.93

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

06-094sc
cpt-1323

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	17.3500			
6.07	5.41	10.65	1.15	17.8000	0.4500	2562.9	3.93
9.02	8.36	12.41	1.76	19.8000	2.0000	881.8	6.89
12.14	11.48	14.69	2.28	22.7500	2.9500	773.5	9.92
15.09	14.43	17.10	2.41	25.7500	3.0000	802.2	12.96
18.04	17.38	19.65	2.56	28.7000	2.9500	866.5	15.91
21.16	20.50	22.46	2.80	33.2500	4.5500	616.2	18.94
24.11	23.45	25.18	2.72	37.4000	4.1500	656.5	21.98
27.07	26.41	27.95	2.77	40.7000	3.3000	839.6	24.93
30.02	29.36	30.76	2.80	43.7500	3.0500	919.5	27.88
33.14	32.48	33.75	2.99	48.0000	4.2500	703.0	30.92
36.09	35.43	36.60	2.85	51.0000	3.0000	950.1	33.95
39.04	38.38	39.46	2.87	54.7500	3.7500	764.1	36.91
42.32	41.66	42.66	3.20	58.0500	3.3000	969.0	40.02
45.11	44.45	45.39	2.73	60.3000	2.2500	1212.2	43.06
48.06	47.40	48.28	2.90	63.3000	3.0000	965.2	45.93
51.02	50.36	51.19	2.90	66.2500	2.9500	983.8	48.88
54.13	53.47	54.25	3.07	69.2500	3.0000	1023.1	51.92
57.09	56.43	57.17	2.91	72.4500	3.2000	910.1	54.95
60.04	59.38	60.08	2.92	75.2500	2.8000	1041.6	57.90
63.48	62.82	63.49	3.41	79.3000	4.0500	841.2	61.10
66.11	65.45	66.09	2.60	81.8000	2.5000	1039.3	64.14
69.06	68.40	69.01	2.93	84.9500	3.1500	928.7	66.93
72.01	71.35	71.94	2.93	87.8000	2.8500	1027.2	69.88
75.13	74.47	75.03	3.09	90.3000	2.5000	1237.0	72.91
78.08	77.42	77.96	2.93	93.0000	2.7000	1085.7	75.95
81.04	80.38	80.90	2.93	95.4500	2.4500	1197.1	78.90
84.15	83.49	84.00	3.10	97.7000	2.2500	1376.6	81.93

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

06-094sc
cpt-1324b

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	9.49	9.49	17.4500			
6.07	5.41	10.65	1.15	18.2000	0.7500	1537.7	3.93
9.02	8.36	12.41	1.76	20.4500	2.2500	783.8	6.89
12.14	11.48	14.69	2.28	23.1500	2.7000	845.1	9.92
15.09	14.43	17.10	2.41	26.4000	3.2500	740.5	12.96
18.04	17.38	19.65	2.56	28.8500	2.4500	1043.3	15.91
21.16	20.50	22.46	2.80	32.6500	3.8000	737.9	18.94
24.11	23.45	25.18	2.72	36.0000	3.3500	813.2	21.98
27.07	26.41	27.95	2.77	39.0000	3.0000	923.6	24.93
30.02	29.36	30.76	2.80	42.2000	3.2000	876.4	27.88
33.14	32.48	33.75	2.99	45.6500	3.4500	866.0	30.92
36.09	35.43	36.60	2.85	49.0000	3.3500	850.9	33.95
39.37	38.71	39.78	3.18	52.0500	3.0500	1044.2	37.07
42.16	41.50	42.50	2.72	54.5500	2.5000	1087.4	40.10
45.11	44.45	45.39	2.89	57.6000	3.0500	946.8	42.98
48.06	47.40	48.28	2.90	60.4000	2.8000	1034.1	45.93
51.02	50.36	51.19	2.90	63.2500	2.8500	1018.3	48.88
54.13	53.47	54.25	3.07	66.3000	3.0500	1006.3	51.92
57.09	56.43	57.17	2.91	69.8500	3.5500	820.4	54.95
60.04	59.38	60.08	2.92	72.4500	2.6000	1121.7	57.90
63.16	62.50	63.17	3.08	75.6500	3.2000	963.1	60.94
66.11	65.45	66.09	2.92	78.7500	3.1000	942.9	63.97
69.06	68.40	69.01	2.93	81.2000	2.4500	1194.0	66.93
72.01	71.35	71.94	2.93	84.1500	2.9500	992.4	69.88
75.13	74.47	75.03	3.09	86.7000	2.5500	1212.7	72.91
77.26	76.60	77.15	2.12	88.5000	1.8000	1176.1	75.54

Shear Wave Velocity Calculations

DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 1.67 Feet

06-094sc
cpt-1325

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
3.12	2.46	2.97	2.97	15.8500			
6.07	5.41	5.66	2.69	16.7500	0.9000	2989.8	3.93
9.02	8.36	8.53	2.87	19.2500	2.5000	1146.4	6.89
12.14	11.48	11.60	3.07	22.3000	3.0500	1007.4	9.92
15.09	14.43	14.53	2.93	25.1500	2.8500	1027.4	12.96
18.04	17.38	17.46	2.94	28.0500	2.9000	1012.6	15.91
21.16	20.50	20.57	3.10	31.6000	3.5500	874.6	18.94
24.11	23.45	23.51	2.94	34.9000	3.3000	892.2	21.98
27.07	26.41	26.46	2.95	37.9000	3.0000	982.0	24.93
30.02	29.36	29.41	2.95	40.8000	2.9000	1016.4	27.88
33.30	32.64	32.68	3.28	44.4000	3.6000	910.0	31.00
36.09	35.43	35.47	2.79	47.4500	3.0500	913.2	34.03
40.03	39.37	39.40	3.93	50.1000	2.6500	1484.2	37.40

Shear Wave Velocity Calculations

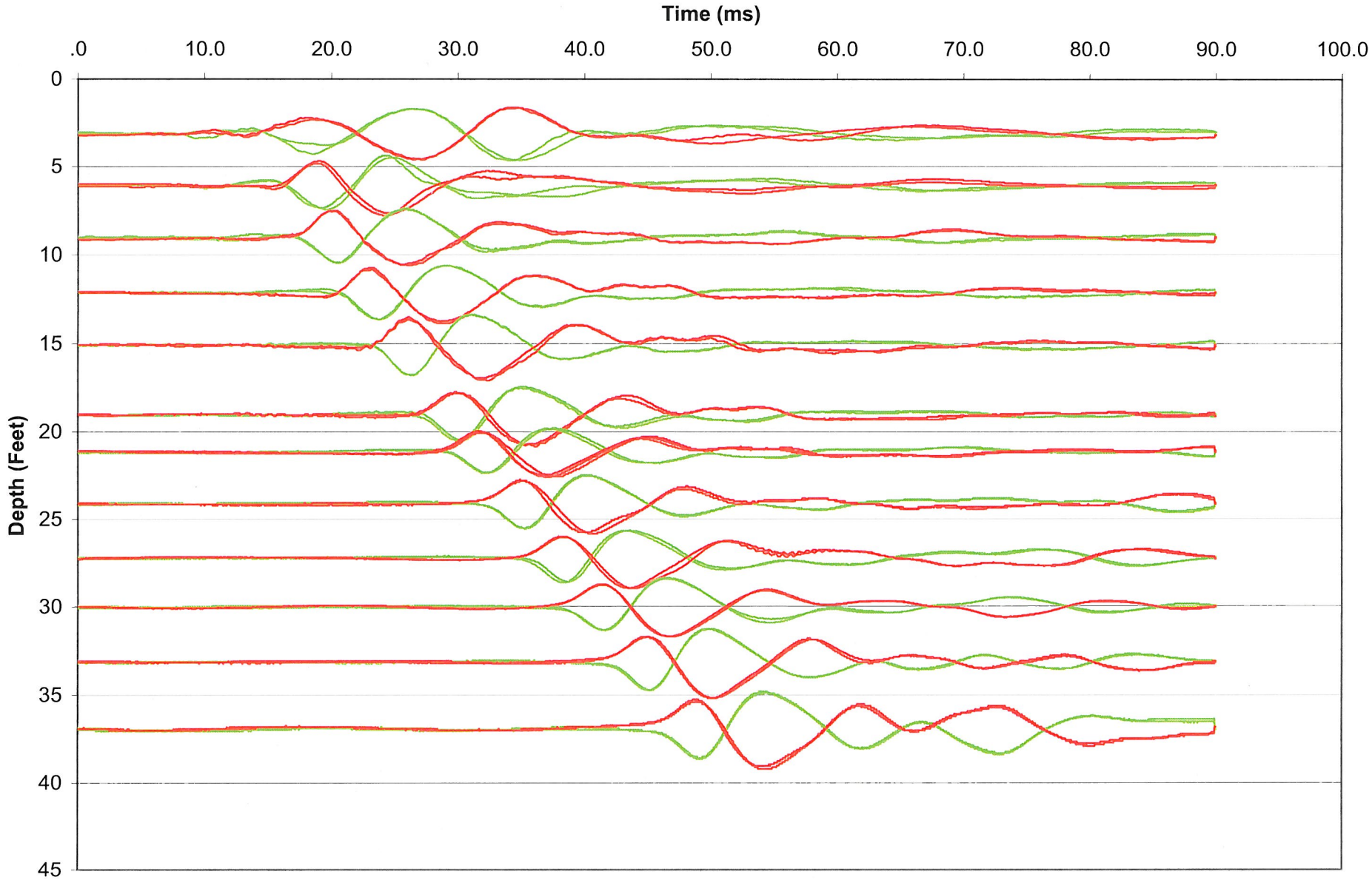
DUKE POWER/CHEROKEE
MACTEC

Geophone Offset: 0.66 Feet
Source Offset: 9.17 Feet

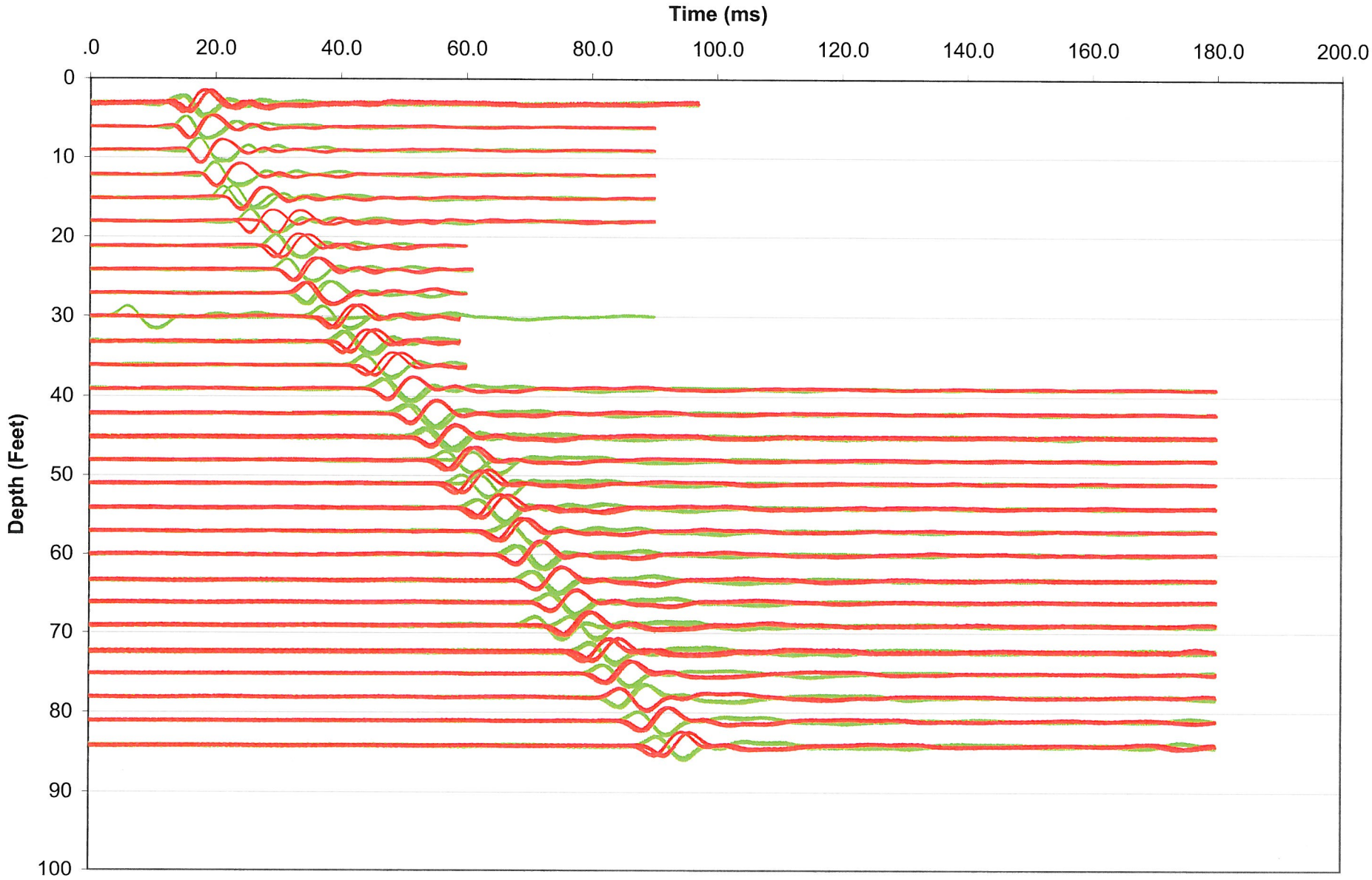
06-094sc
cpt-1325a

Test Depth (Feet)	Geophone Depth (Feet)	Waveform Ray Path (Feet)	Incremental Distance (Feet)	Characteristic Arrival Time (ms)	Incremental Time Interval (ms)	Interval Velocity (Ft/Sec)	Interval Depth (Feet)
43.14	42.48	43.46	43.46	56.3000			
46.10	45.44	46.35	2.89	59.3500	3.0500	947.7	43.96
49.05	48.39	49.25	2.90	61.9000	2.5500	1136.4	46.91
51.34	50.68	51.51	2.26	64.7000	2.8000	806.5	49.54
54.63	53.97	54.74	3.23	67.5500	2.8500	1133.9	52.33
55.12	54.46	55.22	0.49				54.21

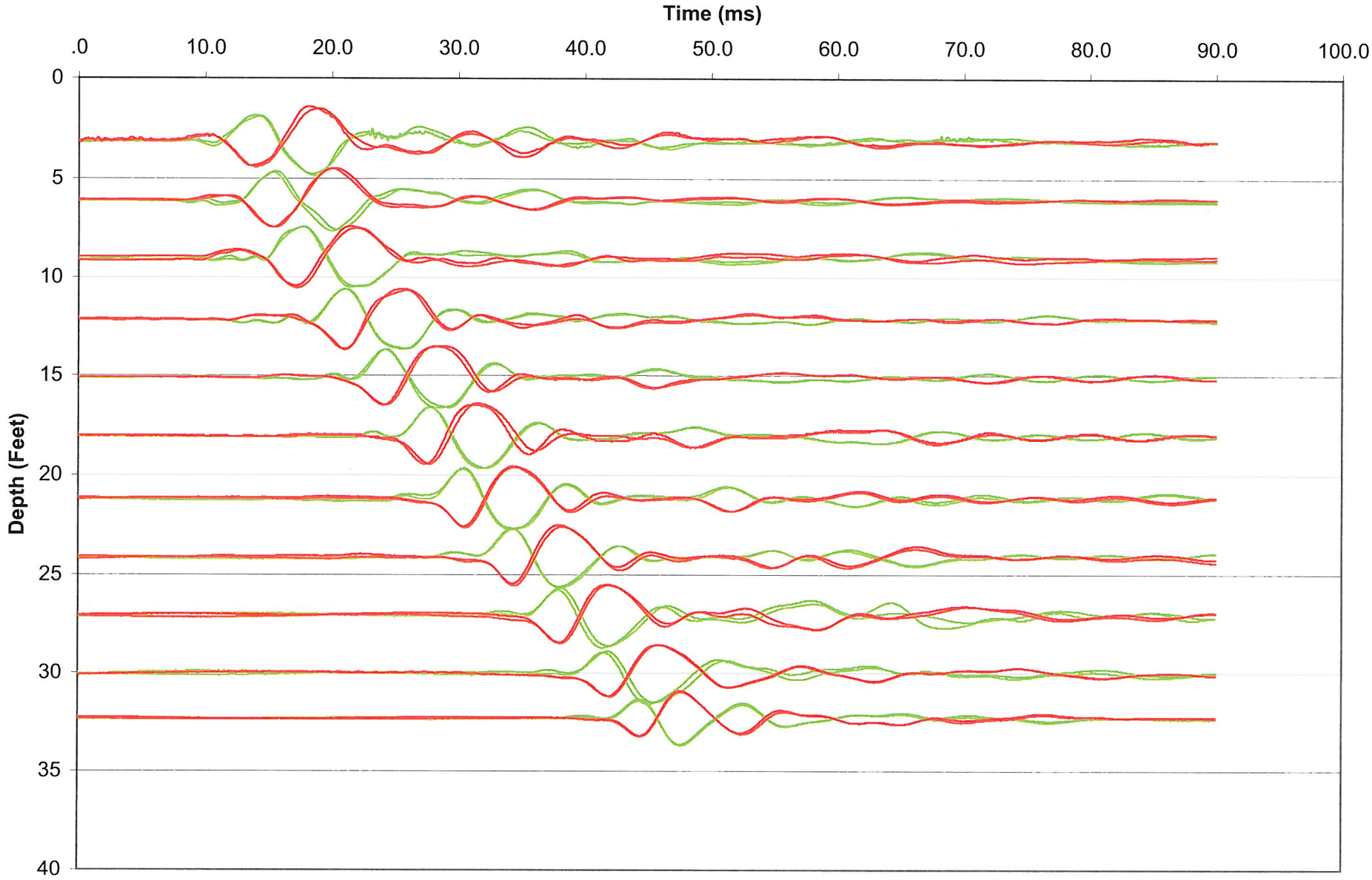
Waveforms for sounding cpt-1308b



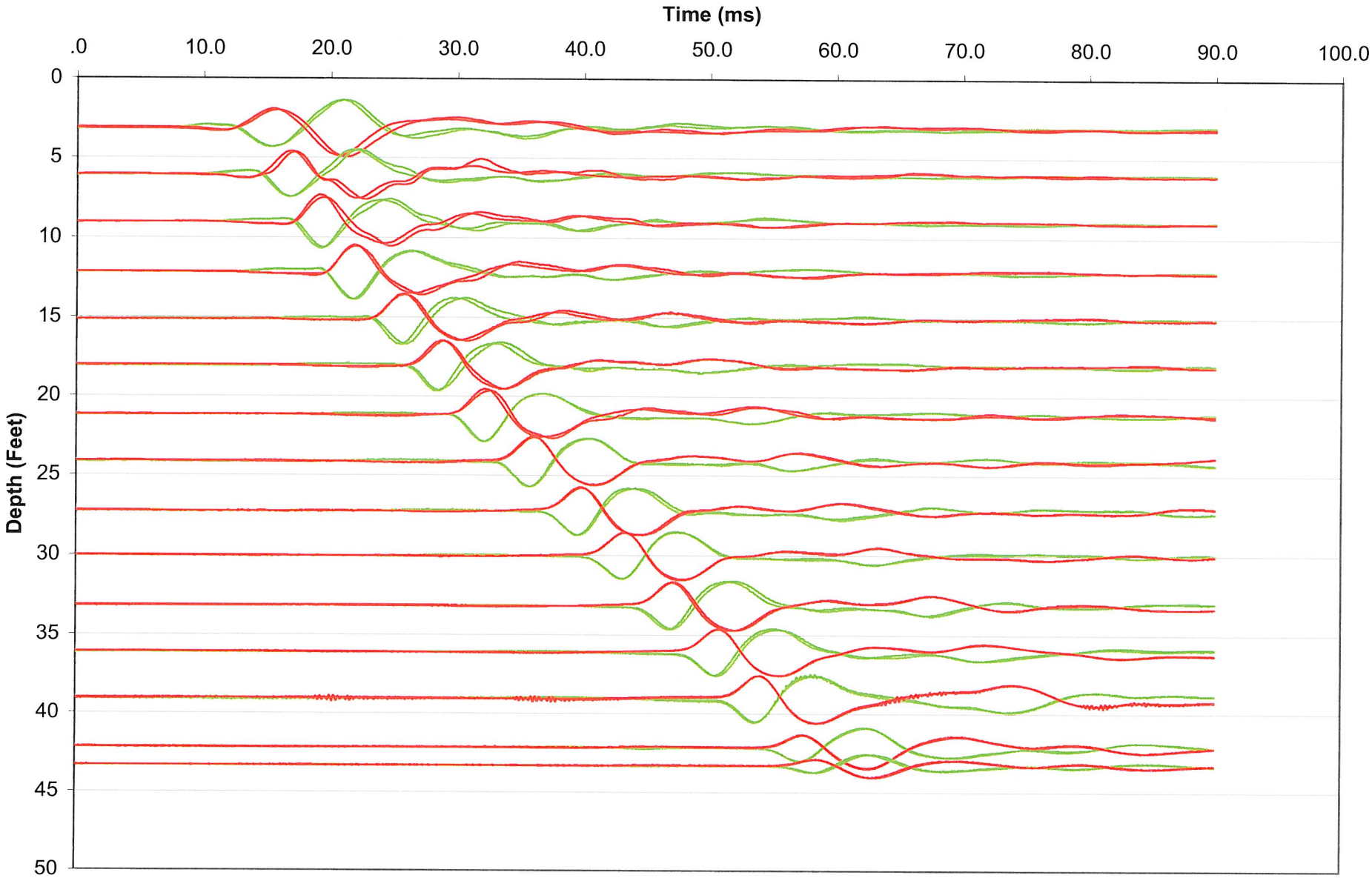
Waveforms for sounding cpt-1309



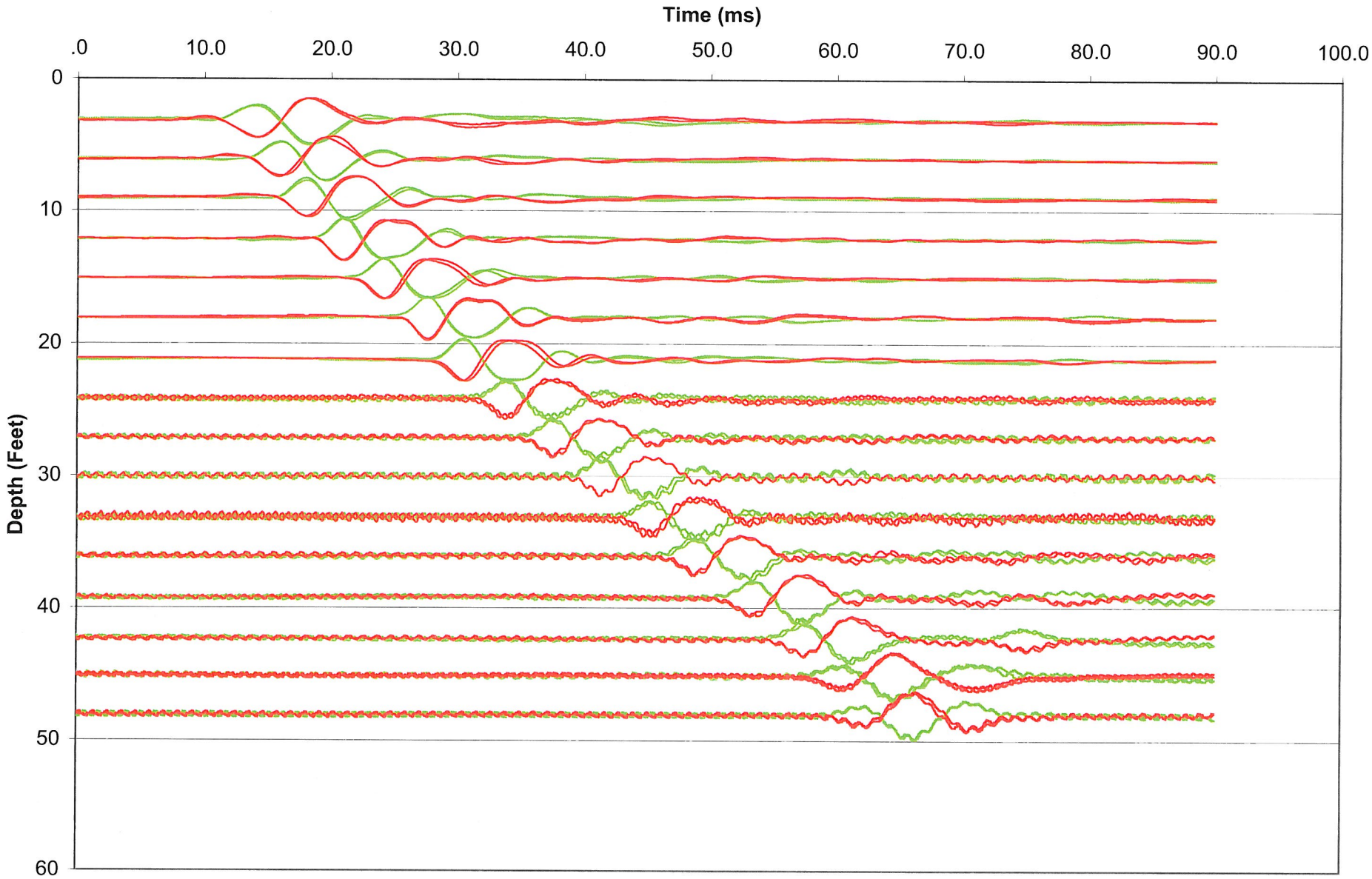
Waveforms for sounding cpt-1320



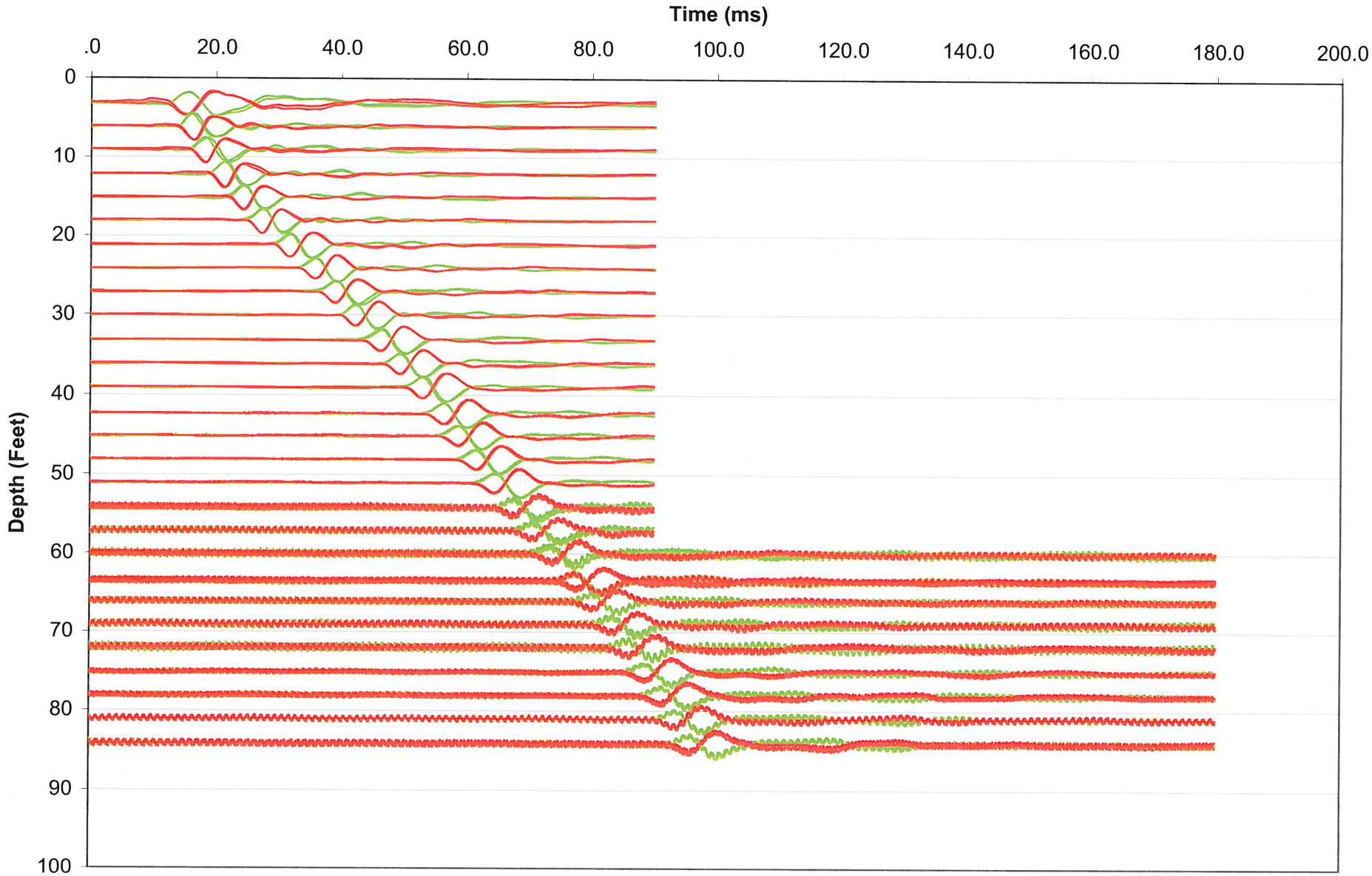
Waveforms for sounding cpt-1321



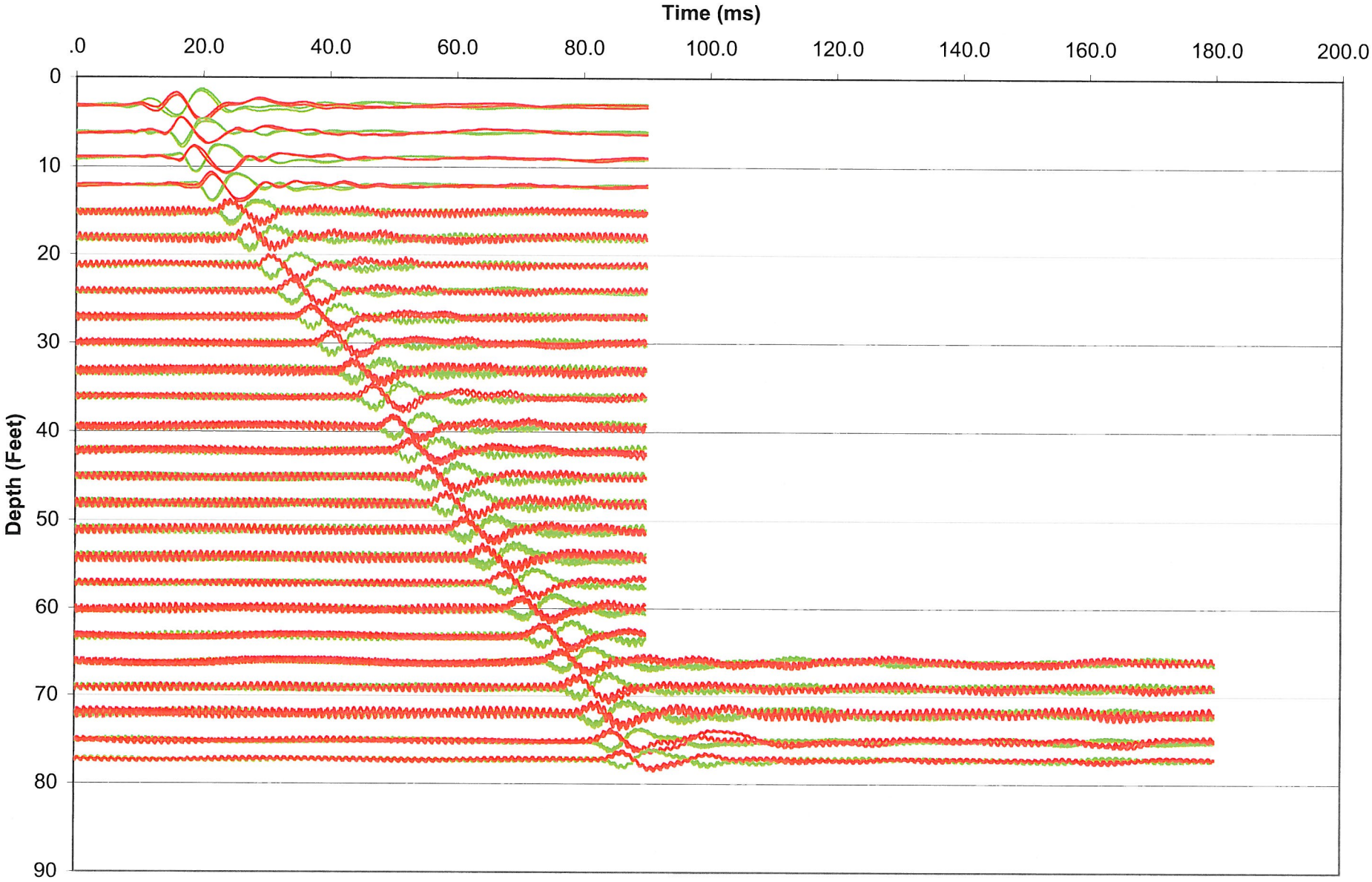
Waveforms for sounding cpt-1322



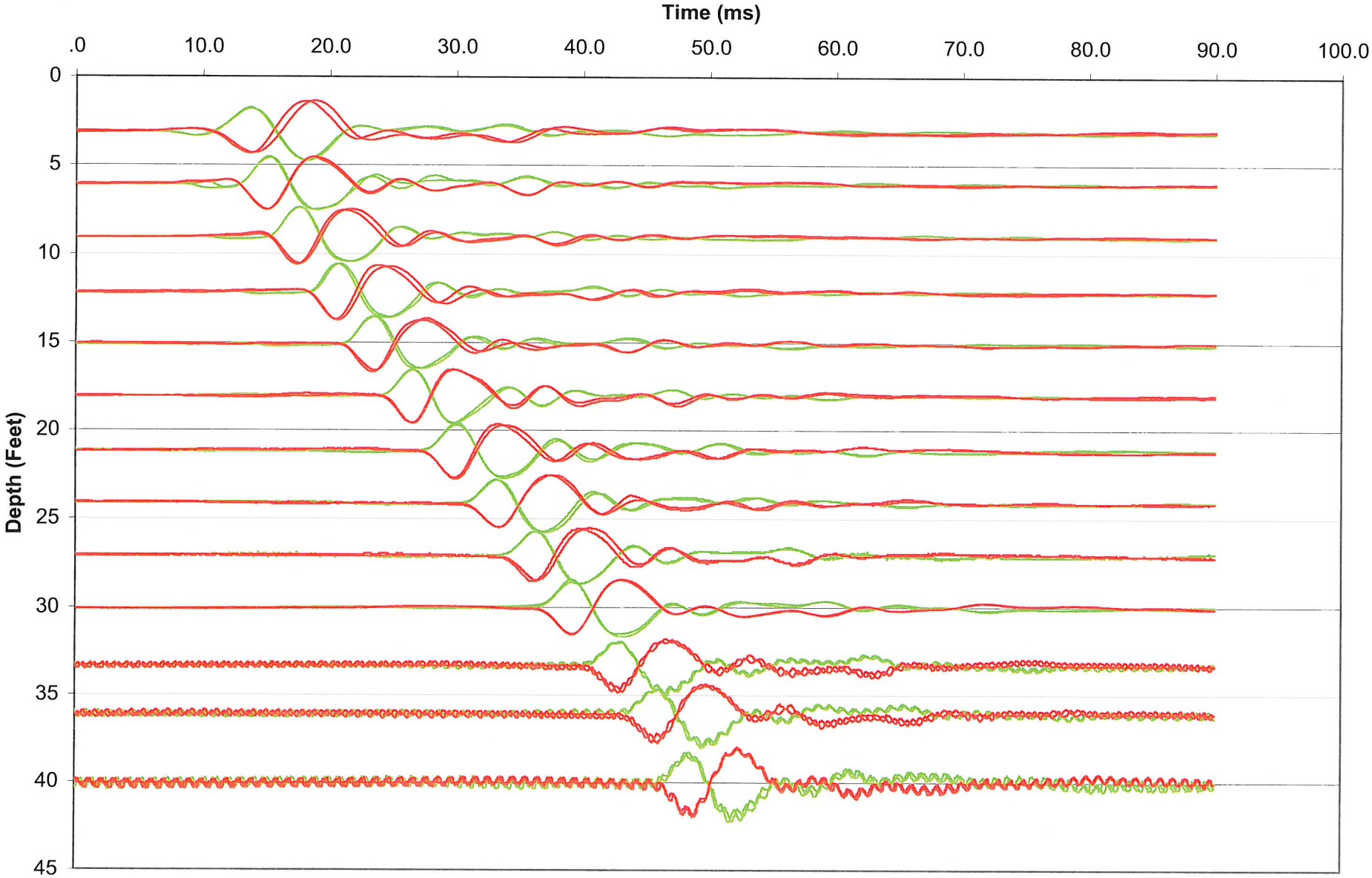
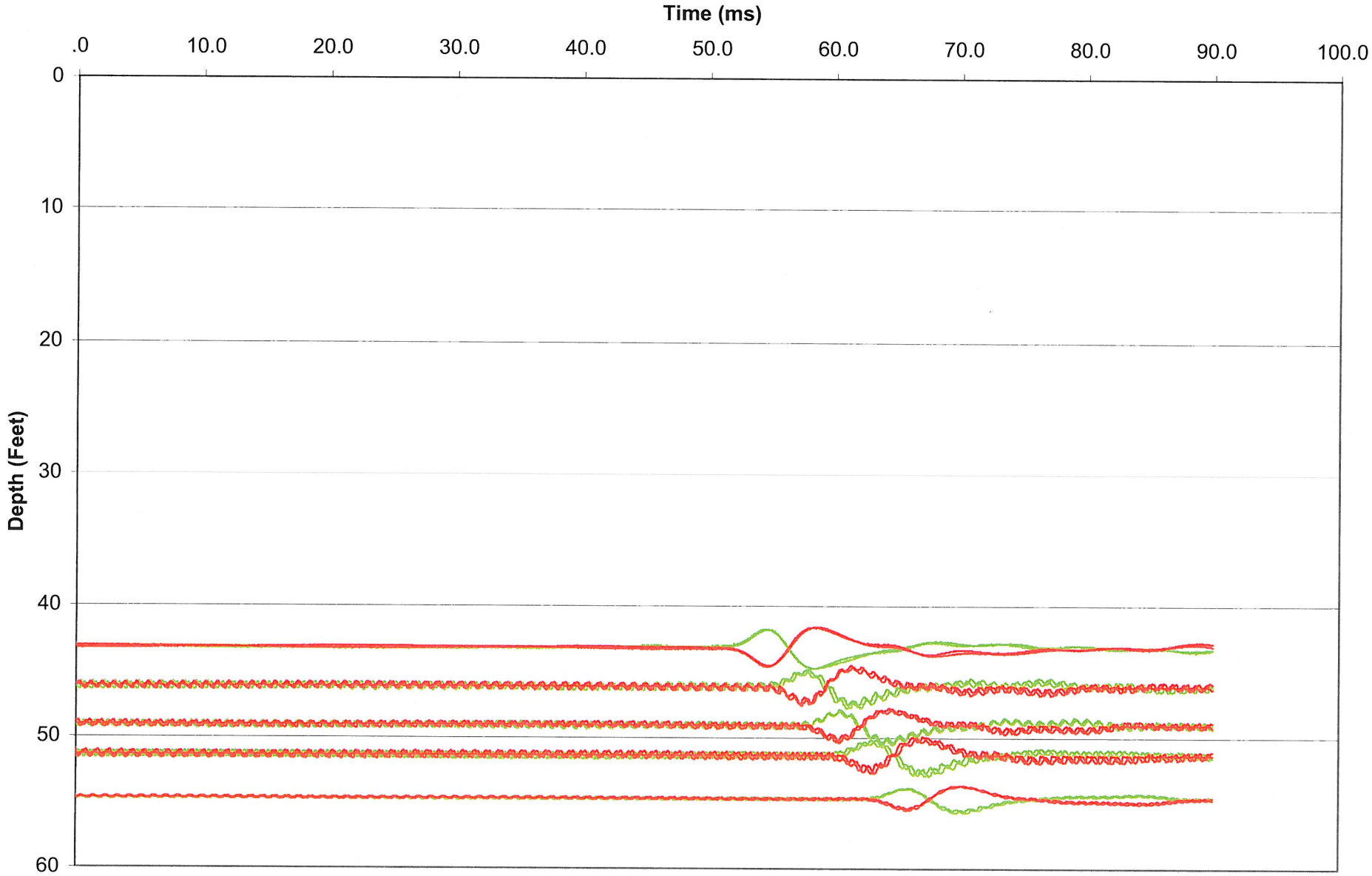
Waveforms for sounding cpt-1323



Waveforms for sounding cpt-1324b



Waveforms for sounding cpt-1325



Waveforms for sounding cpt-1325a