Appendix 2.5A—Geotechnical Investigation and Laboratory Testing Data Report – ESP

(Excludes contents of report Appendix G)

Prepared by
MACTEC Engineering and Consulting, Inc.

November 16, 2007

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MACTEC
engineering and constructing a better tomorrow

November 16, 2007

Mr. Thomas O. McCallum
Southern Nuclear Operating Company, Inc.
40 Inverness Center Parkway
Post Office Box 1295
Birmingham, Alabama 35201
Phone: (205) 992-6697
e-mail: tomccall@southernco.com

Subject: **Data Report of Geotechnical Investigation and Laboratory Testing**
Southern Advanced Light Water Reactor, Early Site Permit
Vogtle Electric Generating Plant
Burke County, Georgia
MACTEC Project Number 6141-05-0227

Dear Mr. McCallum:

MACTEC Engineering and Consulting, Inc. (MACTEC) and our team of subconsultants are pleased to submit this data report relating to the Early Site Permit (ESP) for the Advanced Light Water Reactor (ALWR) proposed at SNOC's Plant Vogtle in Burke County, Georgia.

The scope of work was generally as described in Technical Specification 25144-000-3PS-CY00-00001, Rev. 0, with modifications based on discussions with BECHTEL and outlined in our Quality Assurance Project Document and subsequent correspondence. Broadly, the scope included soil borings, soil coring, rock coring, piezo-cone soundings, seismic cone soundings, well installation, field permeability testing using newly installed and pre-existing wells, borehole geophysical logging and laboratory soil testing.

This Data Report was originally submitted on February 22, 2006 and re-issued on August 9, 2006 in electronic file format. This revision of the Data Report, dated November 16, 2007 is submitted to include revisions to Appendix A – Boring Data and additional laboratory testing performed in October, 2007. Other Appendices (B, C, D, E, F, G) are unchanged and are not re-submitted with this revision, but are referenced in the Table of Contents.

The changes to the boring logs were made to clarify material descriptors of the various strata. The changes to the boring logs are based on re-examination of the soil samples by MACTEC and/or additional laboratory classification testing performed in October, 2007. In addition, revisions to the depth/elevation of the Utley Limestone in some of the borings were made based on the criteria used to identify the Utley Limestone for the COL Geotechnical Borings. Depictions of the changes are difficult to illustrate on the boring logs; therefore, a Log of Revisions to the geotechnical boring logs is provided in Appendix A.

Additional results of laboratory testing performed in October, 2007 are included in a new Appendix H – Carbonate Content Test Results as shown in the Table of Contents. Additional testing included carbonate content tests (ASTM D4373 and ASTM D3042), and index tests consisting of gradation (sieve), and Atterberg limits.

Should you have any questions, please do not hesitate to contact us at 404-873-4761.

Sincerely,

MACTEC Engineering and Consulting, Inc.

Pieter J. DePree

Pieter J. DePree, P.E.
Principal Engineer With Permission by: KMR

Wm. Allen Lancaster
Project Manager

Distribution: Addressee (2)
Mr. John Damm, BECHTEL (1)

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List of Appendices

Appendix	Submittal Date	Attachment Title
A	November 16, 2007	Boring Data (Revised)
B	February 22, 2006	CPT Report
C	February 22, 2006	Geophysical Report
D	February 22, 2006	Field Permeability Testing
E	February 22, 2006	Laboratory Testing
F	February 22, 2006	Hammer Calibration
G	February 22, 2006	Core Photos
H	November 16, 2007	Carbonate Content Test Results (Not Previously Submitted)

1 BACKGROUND

1.1 Purpose

The purpose of the work is defined by Technical Specification 25144-000-3PS-CY00-00001, Rev. 0, prepared by Bechtel Power Corporation (Bechtel). In brief, the Southern Nuclear Operating Company, Inc. (SNOC) requires an Early Site Permit (ESP) for an Advanced Light Water Reactor (ALWR) at Plant Vogtle in Burke County, Georgia. Obtaining this permit requires significant geotechnical and geologic data.

1.2 Site Description

The site is located west of the main Plant Vogtle area. Topography is generally defined by a gently rolling river terrace ranging from about elevation 210 to 280 feet, MSL. The area drains to the north and northwest toward the Savannah River. There has been some past grading including large fills in portions of the area. The area is generally wooded with small to medium pines and traversed by various roadways, mostly unpaved. Support buildings related to the existing plant are located along the southern side of the investigation area.

1.3 Project Description

The project will consist of a new Advanced Light Water Reactor (ALWR) unit. Details of construction are not yet available, but we anticipate major components of the construction will include a reactor vessel, turbine building with turbine supports, and cooling towers. These major structures will likely require high capacity foundations which will likely bear at depth. Ancillary structures will include office and service buildings, buried pipelines and other utilities, and paved areas including parking, loading, and roadways. Grading with excavation and fill on the order of 30 to 40 feet is likely.

2 SCOPE OF WORK

The scope of MACTEC's services was in general accordance with Technical Specification 2514-000-3PS-CY00-00001, Rev. 0, with modifications based on discussions with BECHTEL and outlined in our Quality Assurance Project Document (QAPD) and subsequent correspondence.

2.1 Preparation

MACTEC obtained permits necessary for performing the work, prepared and submitted a QAPD for the work which was reviewed and approved by Bechtel. Exploratory locations were then located using surveying methods to the nearest 0.5 feet horizontally and the nearest 0.1 foot vertically using third order accuracy surveying techniques. At the completion of exploratory activities, locations were resurveyed to capture changes in locations necessitated by various conditions and coordinated with BECHTEL. Completed locations are shown on Figure 1. Prior to exploration, the MACTEC team located existing underground utilities near the exploratory locations and submitted a report of the locations. In some cases, minor clearing and site preparation was required at the exploratory locations.

Prior to conducting standard penetration tests (SPT) our rig-mounted, automatic hammers were calibrated (see GRL Report in Appendix F). Hammer energy varied from 65 to 87 percent of theoretical. Although there was some correlation of hammer energy to depth, the correlation was not perfect and correction of SPT results to N_{60} values would entail some subjective judgment. Therefore, SPT results presented in the boring logs in Appendix A are uncorrected and results of hammer calibration are presented in Appendix F.

2.2 Subsurface Exploration

2.2.1 Soil Boring and Sampling

Twelve borings, designated B-1001 through B-1011 and B-1013, were drilled at the site. Boring locations are shown on Figure 1 and tabulated along with logs of borings in Appendix A. Boring B-1012 was eliminated from the scope by SNOC/BECHTEL.

Except for boring B-1003, all borings were advanced using mud-rotary drilling techniques and polymer and/or bentonite drilling fluid to depths of 100 to 304 feet below the ground surface. Standard Penetration Tests (SPT) were conducted continuously (at 1.5 foot intervals) in the upper 15 feet of each boring and at 5 to 10 foot intervals thereafter. Relatively undisturbed (Shelby Tube, Pitcher, or Piston) samples were collected at intervals selected by SNOC/BECHTEL. In cohesive soils, a pocket penetrometer and/or Torvane device were used to evaluate the undisturbed samples shortly after collection.

Borings were drilled at B-1002A and C-1005A to facilitate suspension logging. No sampling was conducted.

Soil samples from the SPT borings were placed into 8 oz. jars with threaded plastic lids. Adhesive paper labels were placed on the sides of the jars. The labels are pre-printed to accommodate pertinent sample information including project identification, date, boring number, sample number and depth, penetration resistance and a brief description of the enclosed sample. Jar samples were placed in cardboard boxes and stored in the on-site sample storage shed as directed by SNOC/BECHTEL. Jar and undisturbed samples selected for additional testing by SNOC/BECHTEL were returned to MACTEC's laboratory at the end of each week.

2.2.2 Continuous Soil Coring

Boring B-1003 was advanced using continuous soil/rock coring procedures to a depth of 1338 feet using a Christensen 94 mm wire line system. A log of this boring is included in Appendix A. To core crystalline rock below a depth of about 1050 feet, grouted casing was installed to allow use of water rather than viscous mud for drilling fluid. Average core recovery was 77%

throughout the entire hole depth. Cores were logged continuously by MACTEC's field geologist prior to photographing and storage. Selected samples from the cores were sealed in glass jars and returned to the laboratory for further testing. Soil and rock cores were placed in wooden core boxes lined with plastic sheeting and stored on-site at the location specified by SNOC/Bechtel. Core boxes were stored in the on-site sample storage shed as directed by SNOC and Bechtel.

2.2.3 Seismic Suspension Logging

Following completion of boreholes 1002, 1002A, 1003, and 1004 and C-1005A, these drill holes were filled with high-consistency drilling mud to maintain open holes. GeoVision then conducted geophysical suspension logging of the holes using various tools. The procedures and results are discussed in detail in Appendix C.

2.2.4 Cone Penetration Testing

Static Cone Penetration Tests (CPT) were conducted at 12 locations (C-1001 through C-1010, plus C-1001A and C-1009A, added due to shallow refusal) to refusal, encountered at depths of 6 to 117 feet by Applied Research Associates, Inc. in general accordance with the specification. At 3 locations, seismic downhole tests were conducted in conjunction with the static CPT. Results are reported in Appendix B.

2.2.5 Grouting Boreholes

After completion of all drilling, sampling, and seismic logging activities in each borehole, holes were grouted full using tremie methods in general accordance with the specification. The grout mix specified in 25144-000-3PS-CY00-00001 was used. Displaced drilling fluid was sprayed over a wide area of the ground surface or allowed to flow into a mud pit excavated near selected boreholes. This procedure was discussed with Mr. Thomas of SNOC on June 14, 2005 at the Vogtle Site.

2.2.6 Field Permeability Testing

In-situ hydraulic conductivity testing was conducted in accordance with Section 8 of ASTM D 4044 in the fifteen new observation wells recently installed at Plant Vogtle by others. The tests were performed utilizing both falling head ("slug-in") and rising head ("slug-out") tests to assess the water transmitting characteristics of the aquifer. The data acquired from the field permeability tests was analyzed to estimate the hydraulic conductivity of the aquifer using the Bower and Rice slug test methodology. A data report containing all of the information required by Section 9 of ASTM D 4044 was prepared presenting the results of the field permeability testing and analyses and is included in Appendix D.

2.2.7 Laboratory Testing

Laboratory Testing was conducted based on laboratory assignments provided by Bechtel. The physical soil testing was performed within MACTEC's laboratory in Atlanta. Test results are included in Appendix E.

Additional testing was performed in October, 2007 which included carbonate content tests (ASTM D4373 and ASTM D3042), and index tests consisting of gradation (sieve), and Atterberg limits. These additional laboratory test results are contained in Appendix H – Carbonate Content Test Results.

FORMATS.CEL AC-ESTD 3/1/99

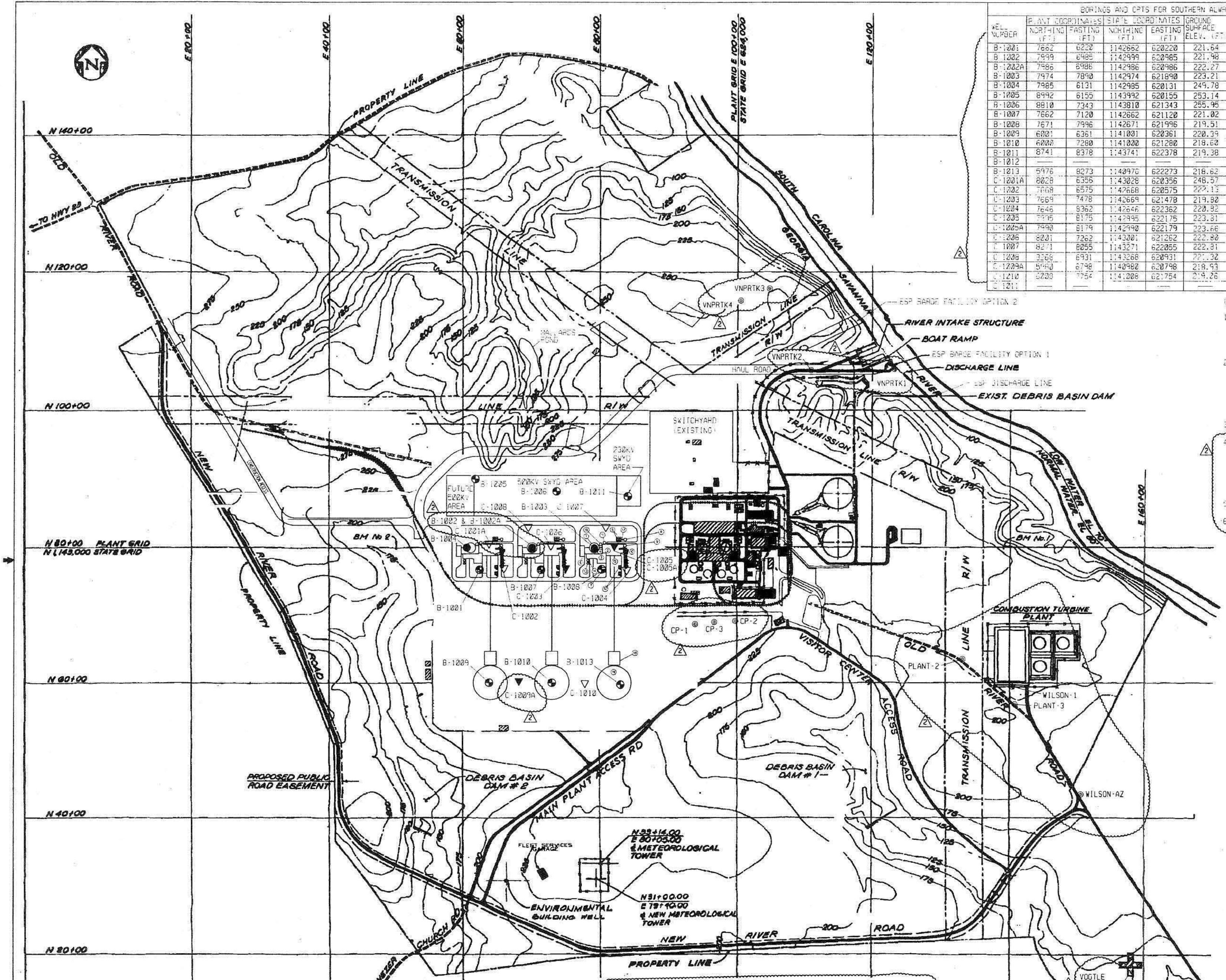


Figure 1: Boring and CPT Location Plan

BORINGS AND CPTS FOR SOUTHERN ALWR ESP							
WELL NUMBER	PLANT COORDINATES		STATE COORDINATES		GROUND SURFACE ELEV. (FT)	DEPTH	REMARKS
	NORTHING (FT)	EASTING (FT)	NORTHING (FT)	EASTING (FT)			
B-1001	7662	6220	1142662	620220	221.64	123.9	
B-1002	7999	6985	1142999	620985	221.98	260	LOCATION OF SUSPENSION P-S VELOCITY LOGGING
B-1002A	7986	6986	1142986	620986	222.27	105	SEE NOTE 4
B-1003	7974	7890	1142974	621890	223.21	1338	LOCATION OF SUSPENSION P-S VELOCITY LOGGING
B-1004	7985	6131	1142985	620131	249.78	304	LOCATION OF SUSPENSION P-S VELOCITY LOGGING
B-1005	8992	6155	1143992	620155	253.14	164.3	
B-1006	8810	7343	1143810	621343	255.95	124.2	
B-1007	7662	7120	1142662	621120	221.02	125	
B-1008	7671	7996	1142671	621996	219.51	124.3	
B-1009	6001	6361	1141001	620361	220.39	98.9	
B-1010	6000	7280	1141000	621280	218.60	104.3	
B-1011	8741	8378	1143741	622378	219.38	100	
B-1012	—	—	—	—	—	—	DELETED
B-1013	5976	8273	1140976	622273	218.62	105	
C-1001A	8028	6356	1143028	620356	248.57	116.7	
C-1002	7668	6575	1142668	620575	222.13	78.5	
C-1003	7669	7478	1142669	621478	219.80	80	LOCATION OF CPT SEISMIC DOWN-HOLE TEST
C-1004	7646	8362	1142646	622362	220.82	77	
C-1005	7995	8175	1142995	622175	223.81	82	LOCATION OF CPT SEISMIC DOWN-HOLE TEST
C-1005A	7990	8179	1142990	622179	223.66	60	SEE NOTE 4
C-1006	8001	7262	1143001	621262	222.80	74	
C-1007	8271	8055	1143271	622055	222.81	81.7	
C-1008	8268	6931	1143268	620931	221.32	76	
C-1009A	5980	6798	1140980	620798	218.93	99	LOCATION OF CPT SEISMIC DOWN-HOLE TEST
C-1210	6208	7754	1141208	621754	219.26	96	
C-1211	—	—	—	—	—	—	DELETED

GENERAL NOTES

1. EXISTING TOPOGRAPHY REPRODUCED FROM ORIGINAL TOPOGRAPHY DRAWINGS PROVIDED BY THE ENGINEERING DEPARTMENT OF GEORGIA POWER CO., ATLANTA, GEORGIA.
2. THE GRID SYSTEM SHOWN IS DESIGNATED 'PLANT GRID SYSTEM'. THE FOLLOWING FACTORS MAY BE APPLIED TO CONVERT TO THE GEORGIA EAST (NAD27) STATE GRID SYSTEM.
   PLANT NORTH + 1,135,000 = STATE NORTH
   PLANT EAST + 614,000 = STATE EAST
3. FLOOD LEVEL EL 165 FT.
4. BOREHOLES B-1002A AND C-1005A WERE DRILLED WITHOUT SAMPLING TO THE DEPTHS SHOWN. THESE BOREHOLES WERE TERMINATED ABOVE THE OBSERVED ZONE OF DRILLING FLUID LOSS TO ALLOW PERFORMANCE OF SUSPENSION P-S VELOCITY LOGGING ABOVE THE BLUE BLUFF MARL.
5. DELETED
6. DELETED.

LEGEND FOR SUBSURFACE INVESTIGATION

◒	BORING
●	BORING WITH SEISMIC SUSPENSION LOGGING
▽	CONE PENETRATION TEST (CPT)
▼	CPT WITH SEISMIC DOWN-HOLE TESTING

LEGEND
MAJOR PERMANENT STRUCTURES
(NUCLEAR POWER BLOCK)

1. CONTAINMENT/SHIELD BUILDING
2. TURBINE BUILDING
3. ANNEX BUILDING
4. AUXILIARY BUILDING
5. SWS COOLING TOWERS
6. RADWASTE BUILDING
7. DIESEL GENERATOR BUILDING
8. FIRE WATER/CLEARWELL STORAGE TANK
9. FIRE WATER STORAGE TANK
10. TRANSFORMER AREA
11. CONDENSATE STORAGE TANK
12. DIESEL GENERATOR FUEL OIL STORAGE TANKS
13. DEMINERALIZED WATER STORAGE TANK
14. BORIC ACID STORAGE TANK
15. TURBINE BUILDING LAYDOWN AREA
16. PASSIVE CONTAINMENT COOLING ANCILLARY WATER STORAGE TANK
17. DIESEL-DRIVEN FIRE PUMP / ENCLOSURE
18. COOLING TOWER PUMP STRUCTURE
19. COOLING TOWER

△	/ /								
△	/ /								
△	/ /								
2	2/7/06	REVISED AS NOTED. INCORPORATED AS-BUILT BORING AND CPT LOCATIONS.	CED	JC	—	JLM	JSP		
1	8/26/05	REVISED BORING LOCATION DEPTHS, AND GENERAL NOTES AS INDICATED.	CED	JC	—	JLM	JSP		
0	5/9/05	THIS DRAWING SUPERSEDES 0-C0K-0000-00002, REV. 0 AND IS RE-ISSUED FOR USE	CED	JC	—	JLM	JSP		
NO.	DATE	REVISIONS	BY	CHK	DES SUPV.	ENGR.	PROJ ENGR	APPR	

SCALE 1"=500'-0" DATE 4/28/2005 DESIGNED JC DRAWN CED CHIEF ENGR.

BECHTEL
FREDERICK, MARYLAND

SOUTHERN NUCLEAR OPERATING COMPANY, INC.
ALVIN W. VOGTLE NUCLEAR PLANT

SUBSURFACE INVESTIGATION
LOCATION PLAN

JOB NO.	DRAWING NO.	REV.
25144	0-CY-0000-00002	2

34"X44" E SIZE

BENCH MARK NUMBER	PLANT COORDINATES		STATE COORDINATES		GROUND SURFACE ELEV. (FT)	DESCRIPTION
	NORTHING (FT)	EASTING (FT)	NORTHING (FT)	EASTING (FT)		
WILSON-1	5951	14017	1140951	628017	206.83	
WILSON-AZ	4362	15015	1139362	629015	178.95	
PLANT-3	5691	14053	1140691	628053	204.52	MONUMENT
PLANT-2	6355	13286	1141355	627286	200.82	MONUMENT
CP-1	6869	9365	1141869	623365	224.41	MONUMENT
CP-2	6914	9955	1141914	623955	244.64	MONUMENT
CP-3	6899	9642	1141899	623642	248.21	MONUMENT
VNPRTK1	10614	12293	1145614	626293	94.90	REBAR
VNPRTK2	10593	11060	1145593	625060	123.37	REBAR
VNPRTK3	11776	10451	1146776	624451	225.84	REBAR
VNPRTK4	11603	10028	1146603	624028	236.82	REBAR

Table 1: Equipment Summary

MACTEC

PLANT VOGTLE - ALWR ESP - EQUIPMENT SUMMARY

CME 55 Drilling Rig
CME 75 Drilling Rig
Speedstar Quickdrill 275 Drilling Rig
Gardner Denver 15 W Drilling Rig
Christiansen Wireline Coring System
ARA Mack-1 Penetrometer Truck
OYO Model 170 Suspension Logging Probe and Recorder
Robertson Geologging Model 3ACS 3 Leg Caliper Probe
Robertson Geologging HIRAT High Resolution Televiewer Probe
InSitu miniTROLL Pressure Transducer
Topcon 303 GTS Total Station

Table 2: Field Boring and CPT Summary

MACTEC

PLANT VOGTLE - ALWR ESP - BORING/CPT LOCATIONS

From Figure 1 - State Grid 1,143,000=plant grid 80+00 (North)
From Figure 1 - State Grid 624,000=plant grid 100+00 (East)

		Plant Grid		State Grid		Termination	Water
Description	**Elevation**	**Northing**	**Easting**	**Northing**	**Easting**	**Depth**	**Elevation**
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
B 1001	221.64	7,661.92	6,220.42	1,142,661.92	620,220.42	123.9	NR
B 1002	221.98	7,998.52	6,985.47	1,142,998.52	620,985.47	260.0	166.0
B 1002A	222.27	7,985.62	6,986.07	1,142,985.62	620,986.07	105.0	176.0
B 1003	223.21	7,974.36	7,889.85	1,142,974.36	621,889.85	1,338.0	NR
B 1003 Top of Casing	224.85	7,974.99	7,889.45	1,142,974.99	621,889.45	1,338.0	NR
B 1004	249.78	7,985.41	6,131.44	1,142,985.41	620,131.44	304.0	117.0
B 1005	253.14	8,991.57	6,155.35	1,143,991.57	620,155.35	164.3	NR
B 1006	255.95	8,810.26	7,342.90	1,143,810.26	621,342.90	124.1	242.0
B 1007	221.02	7,662.29	7,120.13	1,142,662.29	621,120.13	125.0	161.0
B 1008	219.51	7,670.93	7,996.15	1,142,670.93	621,996.15	124.5	168.0
B 1009	220.39	6,000.54	6,361.26	1,141,000.54	620,361.26	98.9	NR
B 1010	218.60	6,000.12	7,279.68	1,141,000.12	621,279.68	104.5	203.0
B 1011	219.38	8,741.13	8,378.01	1,143,741.13	622,378.01	100.0	NR
B 1013	218.62	5,976.08	8,272.50	1,140,976.08	622,272.50	105.0	205.0
C 1001A	248.57	8,028.13	6,355.97	1,143,028.13	620,355.97	116.7	NR
C 1002	222.13	7,667.65	6,574.64	1,142,667.65	620,574.64	78.5	NR
C 1003	219.80	7,669.31	7,477.88	1,142,669.31	621,477.88	80.0	175.2
C 1004	220.82	7,646.13	8,361.85	1,142,646.13	622,361.85	77.0	NR
C 1005	223.81	7,995.27	8,174.61	1,142,995.27	622,174.61	82.0	189.8
C 1005A	223.66	7,989.75	8,179.26	1,142,989.75	622,179.26	90.0	NR
C 1006	222.80	8,001.46	7,261.58	1,143,001.46	621,261.58	74.0	NR
C 1007	222.81	8,270.62	8,055.05	1,143,270.62	622,055.05	81.7	NR
C 1008	221.30	8,268.48	6,930.90	1,143,268.48	620,930.90	76.0	NR
C 1009A	218.93	5,979.63	6,798.49	1,140,979.63	620,798.49	99.0	NR
C 1010	219.06	6,008.35	7,754.15	1,141,008.35	621,754.15	96.0	NR
OW 1001A Conc Pad/Grade	226.38	7,893.50	6,218.43	1,142,893.50	620,218.43	45.0	NR
OW 1001A Top of Casing	228.85	7,893.50	6,218.43	1,142,893.50	620,218.43	45.0	NR

NR = No Reading, unable to record water level due to drilling mud.

Table 3: Laboratory Test Summary

MACTEC

BORING NO.	SAMPLE NO.	DEPTH/ELEV.	USCS	MATERIAL DESCRIPTION	LL	PL	PI
B-1002							
	6	7.5'/214.28'		Silty sand			
	11	18.5'/203.48'		Silty sand			
	13	28.5'/193.48'		Silty sand			
	14	33.5'/188.48'		Sandy silt			
	15	38.5'/183.48'		Silty clay	48	27	21
	18	53.5'/168.48'		Silty sand			
	20	63.5'/158.48'		Silty sand			
	22	73.5'/148.48'		Silty sand			
	24	83.5'/138.48'		Silty sand			
	UD-1 Upper	92.0'/129.98'	GM	Silty gravel with sand	72	37	35
	UD-1 Middle	92.0'/129.98'		Silty gravel with sand			
	UD-2	103.5'/118.48'	CL	Sandy silt	34	22	12
	UD-3	113.5'/108.48'	SC	Clayey sand	29	19	10
	UD-4	123.5'/98.48'	GC-GM	Silty clayey gravel with sand	22	17	5
	UD-5	133.5'/88.48'	SM	Silty sand with gravel	32	25	7
	33	153.5'/68.48'	CL	Sandy silt with gravel	34	21	13
	38	188.5'/33.48'	SM	Silty sand	NP	NP	NP
	43	238.5'/-16.52'		Silty sand			
B-1003							
	3	15.0'/208.21'		Silty sand			
	7	35.0'/185.21'		Silty sand			
	11	55.0'/168.21'		Silty gravel with sand			
	14	75.0'/148.21'		Poorly graded sand with silt			
	17	88.0'/135.21'	SM	Silty sand with gravel	93	42	51
	UD-1	93.0'/130.21'	SM	Silty sand	54	32	22
	22	104.7'/118.51'	SM	Silty sand	83	51	32
	27	121.7'/101.51'	SM	Silty sand	NP	NP	NP
	31	141.7'/81.51'	SM	Silty sand	46	28	18
	36	165.7'/57.51'	SP-SM	Poorly graded sand with silt	NP	NP	NP
	40	185.7'/37.51'		Silty sand			
	44	205.7'/17.51'		Silty sand			
	51	240.7'/-17.49'		Poorly graded sand with silt			
	59	280.7'/-57.49'		Silty sand			
	66	315.7'/-92.49'	GW	Well-graded gravel with sand	53	38	15
	73	350.7'/-127.49'	CL	Silt with sand	41	22	19
	83	400.7'/-177.49'		Silty sand			
	93	450.7'/-227.49'		Silty sand			
	103	496.7'/-273.49'		Silty sand			

BORING NO.	SAMPLE NO.	DEPTH/ELEV.	USCS	MATERIAL DESCRIPTION	LL	PL	PI
B-1004							
	7	9.0'/240.78'		Silty sand			
	9	12.0'/237.78'		Silty sand			
	12	23.5'/226.28'		Silty sand			
	16	43.5'/206.28'	CH	Silt with sand	58	24	34
	18	53.5'/196.28'		Sandy silt			
	21	68.5'/181.28'		Silty sand			
	24	83.5'/166.28'		Silty sand			
	32	123.5'/126.28'	GM	Silty gravel with sand	43	19	24
	UD-1 Upper	144.0'/105.78'	SM	Silty sand	59	38	21
	UD-1 Middle	144.0'/105.78'		Silty sand			
	UD-2	153.5'/96.28'	SM	Silty sand	43	27	16
	UD-3 Upper	163.5'/86.28'	GC	Clayey gravel with sand	31	22	9
	UD-3 Middle	163.5'/86.28'		Clayey gravel with sand			
	UD-4 Upper	177.0'/72.78'	SM	Silty sand with gravel	31	22	9
	UD-4 Middle	177.0'/72.78'		Silty sand with gravel			
	UD-5	188.5'/61.28'	SM	Silty sand with gravel	34	27	7
	UD-6	198.5'/51.28'	SC	Silty sand	31	21	10
B-1006							
	6	7.5'/248.45'		Poorly graded sand with silt			
	14	33.5'/222.45'		Silty sand			
	19	58.5'/197.45'	CH	Silt with sand	97	30	67
	21	68.5'/187.45'		Silty sand			
	25	88.5'/167.45'		Silty sand			
	29	108.5'/147.45'		Silty sand with gravel			
	32	123.5'/132.45'	MH	Silt with sand	99	43	56
B-1010							
	6	7.5'/211.1'		Silty sand			
	14	33.5'/185.1'		Silty sand			
	19	58.5'/160.1'		Silty sand			
	22	73.5'/145.1'		Silty sand			
	27	98.5'/120.1'	CH	Sandy silt	94	36	58

MACTEC

APPENDIX A (Revised November 16, 2007)

Table of As Built Surveyed Boring, Well, and Probe Locations
Key to Symbols
Log of Revisions to ESP Geotechnical Boring Logs
Boring Logs (14)

Table 2: Field Boring and CPT Summary

MACTEC

PLANT VOGTLE - ALWR ESP - BORING/CPT LOCATIONS

From Figure 1 - State Grid 1,143,000=plant grid 80+00 (North)
From Figure 1 - State Grid 624,000=plant grid 100+00 (East)

Description	Elevation (ft)	Plant Grid		State Grid		Termination Depth (ft)	Water Elevation (ft)
		Northing (ft)	Easting (ft)	Northing (ft)	Easting (ft)		
B 1001	221.64	7,661.92	6,220.42	1,142,661.92	620,220.42	123.9	NR
B 1002	221.98	7,998.52	6,985.47	1,142,998.52	620,985.47	260.0	166.0
B 1002A	222.27	7,985.62	6,986.07	1,142,985.62	620,986.07	105.0	176.0
B 1003	223.21	7,974.36	7,889.85	1,142,974.36	621,889.85	1,338.0	NR
B 1003 Top of Casing	224.85	7,974.99	7,889.45	1,142,974.99	621,889.45	1,338.0	NR
B 1004	249.78	7,985.41	6,131.44	1,142,985.41	620,131.44	304.0	117.0
B 1005	253.14	8,991.57	6,155.35	1,143,991.57	620,155.35	164.3	NR
B 1006	255.95	8,810.26	7,342.90	1,143,810.26	621,342.90	124.1	242.0
B 1007	221.02	7,662.29	7,120.13	1,142,662.29	621,120.13	125.0	161.0
B 1008	219.51	7,670.93	7,996.15	1,142,670.93	621,996.15	124.5	168.0
B 1009	220.39	6,000.54	6,361.26	1,141,000.54	620,361.26	98.9	NR
B 1010	218.60	6,000.12	7,279.68	1,141,000.12	621,279.68	104.5	203.0
B 1011	219.38	8,741.13	8,378.01	1,143,741.13	622,378.01	100.0	NR
B 1013	218.62	5,976.08	8,272.50	1,140,976.08	622,272.50	105.0	205.0
C 1001A	248.57	8,028.13	6,355.97	1,143,028.13	620,355.97	116.7	NR
C 1002	222.13	7,667.65	6,574.64	1,142,667.65	620,574.64	78.5	NR
C 1003	219.80	7,669.31	7,477.88	1,142,669.31	621,477.88	80.0	175.2
C 1004	220.82	7,646.13	8,361.85	1,142,646.13	622,361.85	77.0	NR
C 1005	223.81	7,995.27	8,174.61	1,142,995.27	622,174.61	82.0	189.8
C 1005A	223.66	7,989.75	8,179.26	1,142,989.75	622,179.26	90.0	NR
C 1006	222.80	8,001.46	7,261.58	1,143,001.46	621,261.58	74.0	NR
C 1007	222.81	8,270.62	8,055.05	1,143,270.62	622,055.05	81.7	NR
C 1008	221.30	8,268.48	6,930.90	1,143,268.48	620,930.90	76.0	NR
C 1009A	218.93	5,979.63	6,798.49	1,140,979.63	620,798.49	99.0	NR
C 1010	219.06	6,008.35	7,754.15	1,141,008.35	621,754.15	96.0	NR
OW 1001A Conc Pad/Grade	226.38	7,893.50	6,218.43	1,142,893.50	620,218.43	45.0	NR
OW 1001A Top of Casing	228.85	7,893.50	6,218.43	1,142,893.50	620,218.43	45.0	NR

NR = No Reading, unable to record water level due to drilling mud.

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 lays 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.

■	Undisturbed Sample	▮	Auger Cuttings
☒	Split Spoon Sample	▒	Bulk Sample
▮	Rock Core	▩	Crandall Sampler
▩	Dilatometer	▨	Pressure Meter
▯	Packer	○	No Recovery
▽	Water Table at time of boring	▼	Water Table after 24 hours

Correlation of Standard Penetration Resistance with Relative Density and Consistency

SAND & GRAVEL		SILT & CLAY	
No. of Blows	Relative Density	No. of Blows	Consistency
0 - 4	Very Loose	0 - 2	Very Soft
5 - 10	Loose	3 - 4	Soft
11 - 30	Medium Dense	5 - 8	Firm
31 - 50	Dense	9 - 15	Stiff
Over 50	Very Dense	16 - 30	Very Stiff
		31 - 50	Hard
		Over 50	Very Hard

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

Reference: The Unified Soil Classification System, Corps of Engineers, U.S. Army Technical Memorandum No. 3-357, Vol. 1, March, 1953 (Revised April, 1960)

KEY TO SYMBOLS AND DESCRIPTIONS

MACTEC

Subject: **Revisions to ESP Geotechnical Boring Logs**
Vogtle Electric Generating Plant
Burke County, Georgia
MACTEC Project Number 6141-05-0227

Note: The following revisions have been made to the Geotechnical Boring Logs prepared for the Plant Vogtle ESP Project. These revisions listed below have been made based on re-examination of samples by MACTEC and/or the results of additional laboratory testing.

REVISIONS TO SOIL CLASSIFICATION:

Boring Number	Depth Interval (feet)	Change	Basis for Change
ALL LOGS	NA	Added boring ELEVATION and ELEVATION DATUM = NAVD 88 for each boring log.	Not Applicable
B-1001	88.5 – 93.0	Changed CLAYEY SAND (SC) to SHELL HASH	This change was based on visual/manual re-examination of the samples by MACTEC
B-1002	92.0 – 100.0	Revised classification from SILTY GRAVEL WITH SAND (GM) to SANDY ELASTIC SILT (MH); dark greenish gray, hard, fine, 30% fines, some small white shell fragments, contains cemented layers and nodules.	This change was based on re-interpretation of previous laboratory data along with additional confirmatory classification testing on sample UD-1. The coarse fraction previously identified in the lab results was attributed to shell and cemented fragments.
B-1002	113.5 – 123.5	Added contains cemented layers and nodules, 30% fines, fine quartz sand with some heavy black minerals observed under 20X hand lens.	This addition was based upon visual/manual re-examination of the samples by MACTEC.
B-1002	123.5 – 133.5	Revised classification from CLAYEY/SILTY GRAVEL WITH SAND (GC-GM) to FOSSILIFEROUS LIMESTONE; dark greenish gray, hard, dry, moderately cemented, some sandy SILT (ML), some shells.	This change was based upon visual/manual re-examination of the samples by MACTEC.

Boring Number	Depth Interval (feet)	Change	Basis for Change
B-1002	133.5 – 140.0	Revised classification from SILTY SAND WITH GRAVEL (SM) to FOSSILIFEROUS LIMESTONE; dark greenish gray, hard, dry, moderately cemented, some sandy SILT (ML), some shells.	This change was based upon re-examination of the samples by MACTEC and additional laboratory classification and carbonate content testing for sample UD-5. The gravel-sized fraction previously identified in the lab results was attributed to cemented pieces of limestone and some shells that were broken during the sampling process.
B-1002	140.0 – 153.5	Revised classification from SILTY SAND WITH GRAVEL (SM) to SILTY SAND (SM); dark green and gray, dry, hard, cemented layers and nodules, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1002	153.5 – 157.0	Revised classification from SANDY CLAY WITH GRAVEL (CL-ML) to SANDY CLAY (CL); gray, very stiff, cemented layers/nodules, trace shell hash, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1003	80.5 – 84.0	Revised classification from CLAYEY SAND WITH GRAVEL (SC); white-light tan, subangular sand and gravel, coarse sand and medium gravel, calcareous sand, moist to wet, +HCL to CLAYEY SAND (SC); white-light tan, subangular sand, coarse, gravel-sized fragments of cemented shell hash, calcareous sand, moist to wet, +HCL.	This change was based on visual/manual re-examination of the samples by MACTEC.
B-1003	86.0 – 96	Revised classification from SILTY SAND WITH GRAVEL (SM) to SILTY SAND (SM).	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1003	96.0 – 98.7	Revised classification from SILTY SAND (SM) to SANDY SILT (ML).	This change is based upon laboratory test results from sample DCS-18.
B-1003	145.7 – 149.0	Revised classification from SILTY SAND (SM) to SANDY LEAN CLAY (CL).	This change is based upon laboratory classification testing from sample DCS-31.
B-1003	315.7 – 325.7	Revised classification from GRAVEL WITH SAND (GM) to CLAY WITH SAND (CL).	This change was based on visual/manual re-examination of the sample by MACTEC and confirmatory laboratory classification testing on sample DCS-66. The gravel-sized fraction previously identified on the lab results was attributed to fragments of weakly cemented/partially indurated clay that were not sufficiently processed during initial sample preparation.

Boring Number	Depth Interval (feet)	Change	Basis for Change
B-1004	123.5 – 128.5	Revised classification from CLAYEY GRAVEL WITH SAND (GC) to CLAYEY SAND (SC); green to white, low to medium plasticity, loose, cemented shells and some shell fragments, 30% fines, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1004	134.0 – 145.5	Revised classification from CLAYEY GRAVEL WITH SAND (GC) to ELASTIC SILT WITH SAND (MH); green, nonplastic, hard, flaky, trace mica, some fine sand, cemented layers/nodules.	This change was based upon visual/manual re-examination of the samples by MACTEC and laboratory classification testing from samples SPT-34 and 35.
B-1004	145.5 – 163.5	Revised classification from SILTY SAND (SM), contains limestone fragments to FOSSILIFEROUS LIMESTONE; recovered mostly broken pieces of impure fossiliferous gray limestone (Marl), consisting of quartz sand, shell fragments, and some phosphatic material cemented in a carbonate matrix, some zones of SILTY SAND (SM).	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1004	163.5 – 173.5	Revised classification from CLAYEY GRAVEL WITH SAND (GC) to ELASTIC SILT (MH); green, low plasticity, hard, 15-20% fine quartz sand, cemented layers and shell hash, dry, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC and laboratory classification testing from sample UD-3.
B-1004	177.0 – 183.5	Revised classification from SILTY SAND WITH GRAVEL (SM) to SILTY SAND (SM); green moist, cemented layers, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1004	183.5 – 198.5	Revised classification from SILTY SAND WITH GRAVEL (SM); green, very dense, homogeneous, trace CLAY, very fine sand, dry, +HCL to SILTY SAND (SM); green, very dense, homogeneous, very fine sand, some quartz, cemented layers, some sand-sized cemented carbonate observed with 20X hand lens. Added layer of LEAN CLAY WITH SAND (CL) from 188.5 to 189.5.	These changes were based upon re-examination of the samples by MACTEC and laboratory classification testing from sample UD-5.
B-1004	198.5 – 203.5	Added green, very dense, very fine sand, dry, +HCL.	This change was based upon visual/manual re-examination of the samples by MACTEC.

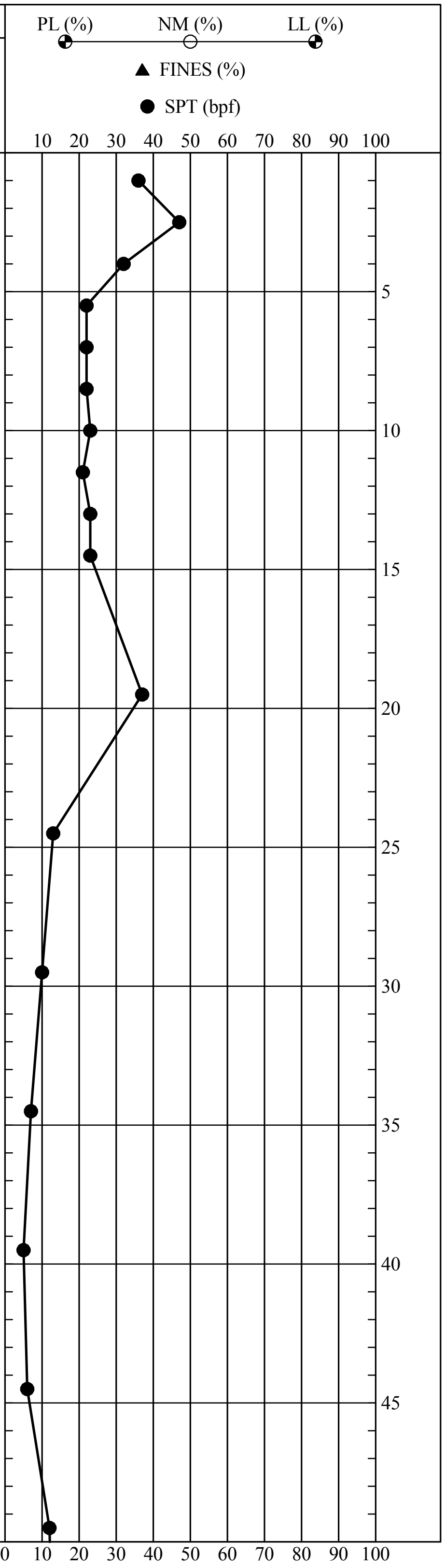
Boring Number	Depth Interval (feet)	Change	Basis for Change
B-1004	203.5 – 208.5	Revised classification from Same as above, gap graded, with black cemented fragments, +HCL to FOSSILIREROUS LIMESTONE; recovered mostly limestone fragments consisting of sand and shells in a carbonate matrix.	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1004	213.5 – 223.5	Revised classification from SILTY SAND (SM) to CLAYEY SAND (SC).	This change is based upon laboratory classification testing from sample SPT-44.
B-1005	153.5 – 157.0	Revised classification from SILTY CLAYEY SAND (SC-SM) to SANDY SILT (ML); tan and white, dense, fine to medium grained, >20% shells, contains broken cemented shell hash/coquina, +HCL.	This change is based upon visual/manual re-examination of the samples by MACTEC.
B-1005	157.0 – 164.3	Revised classification from SILTY SAND (SP-SM) to SILTY SAND (SM)	This change is based upon re-examination by MACTEC of the original rig engineer’s log for this boring.
B-1006	108.5 – 118.5	Revised classification from SILTY SAND WITH GRAVEL (SM) to SILTY SAND (SM); tan and white, dense, contains appreciable cemented shells, fine grained, wet, +HCL.	This change is based upon visual/manual re-examination of the samples by MACTEC.
B-1008	78.5 – 93.5	Changed CLAYEY SAND (SC); light brown and tan with gravel composed of cemented shells to CLAYEY SAND (SC); light brown and tan with cemented shells.	This change was based upon visual manual re-examination of the samples by MACTEC.
B-1008	93.5 – 124.5	Revised classification from SANDY CLAYEY SILT (SC-SM) to SANDY CLAYEY SILT (ML).	This change was based upon visual/manual re-examination of the samples by MACTEC.
B-1010	97 – 100	Revised classification from CLAYEY SAND (SC) to ELASTIC SILT (MH)	This change was based upon visual/manual re-examination of the samples and laboratory classification testing for sample SPT-27.
B-1011	12.0 – 13.5	Changed with gravel to with cemented shell hash.	This change was based upon visual/manual re-examination of the samples by MACTEC.

REVISIONS TO LOCATION OF UTLEY LIMESTONE:

Boring Number	Original Depth of top of Utley Limestone (feet)	New Depth of top of Utley Limestone (feet)
B-1001	58.5	88.5
B-1003	48.0	80.5
B-1004	63.5	123.5
B-1005	53.5	153.5
B-1006	Not Present	108.5
B-1007	70.0	Not Present
B-1008	63.5	77.0
B-1011	13.5	68.5

Note: Revisions to the depth/elevation of the Utley Limestone in the borings were made based on the criteria used to identify the Utley Limestone for the COL Geotechnical Borings, and based on re-examination of the samples by MACTEC.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	CRUSHED STONE with fines	222	SS-1	☒	7-14-22 (N = 36)
	Top of Barnwell Formation at 1.5'		SS-2	☒	13-25-22 (N = 47)
	SAND (SP); brown, subangular, dense, dry, -HCL				
	SAND WITH SILT (SP-SM); brown, subangular, dense, moist, -HCL		SS-3	☒	13-17-15 (N = 32)
5	SAND WITH SILT (SP-SM); tan, subangular, dense, moist, -HCL	217	SS-4	☒	8-10-12 (N = 22)
	SAND WITH SILT (SP-SM); tan brown, subangular, mottled, moist, -HCL, with traces of CLAY		SS-5	☒	11-10-12 (N = 22)
	SAND WITH SILT (SP-SM); tan brown, subangular, mottled, dry, -HCL, with traces of CLAY		SS-6	☒	8-10-12 (N = 22)
10	SAND WITH SILT (SP-SM); tan, brown and red, subangular, mottled, dry, -HCL	212	SS-7	☒	9-10-13 (N = 23)
	Same as above, mottled with grey CLAY and SILTY SAND		SS-8	☒	5-8-13 (N = 21)
	Same as above, contains subangular QUARTZ fragments				
	Same as above, contains layers of CLAYEY SILT		SS-9	☒	7-11-12 (N = 23)
	SAND (SP); brown, subangular, moist, -HCL		SS-10	☒	7-11-12 (N = 23)
15	Same as above, wet	207			
	Same as above, intermittent with layers of tan and brown SILT		SS-11	☒	11-19-18 (N = 37)
20		202			
	SAND (SP); tan and brown, subangular, moist, -HCL		SS-12	☒	6-7-6 (N = 13)
25		197			
	SANDY SILT (ML); tan, fine, nonplastic, stiff, dry, -HCL, contains traces of SAND and CLAY		SS-13	☒	2-4-6 (N = 10)
30		192			
	Same as above, firm and mottled with brown very fine SAND		SS-14	☒	2-3-4 (N = 7)
35		187			
	SAND (SP); grey and brown, subangular, loose, moist, -HCL with isolated patches of shells		SS-15	☒	3-2-3 (N = 5)
40		182			
	SAND WITH SILT (SP-SM); grey, loose, moist, -HCL		SS-16	☒	5-3-3 (N = 6)
45		177			
	SAND (SP); grey, medium dense, moist to wet, -HCL		SS-17	☒	5-6-6
50		172			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7661.92, E 6220.42 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 221.64

ELEVATION DATUM = NAVD 88

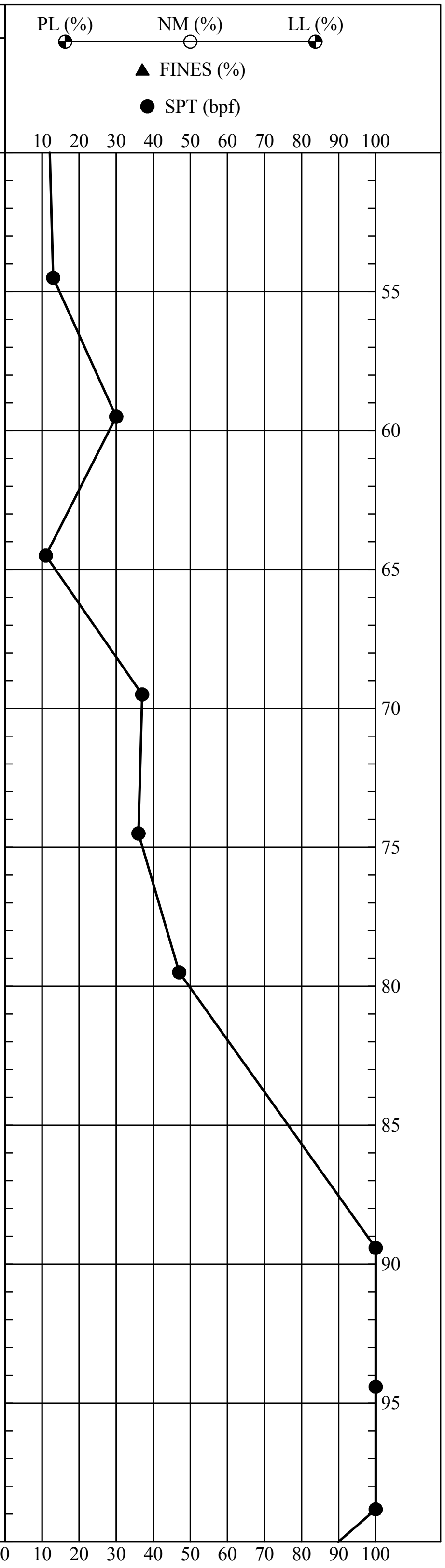
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1001
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
50	SAND (SP); grey, medium dense, moist to wet, -HCL	172			(N = 12)
	Same as above, wet		SS-18	☒	6-7-6 (N = 13)
55		167			
	SAND WITH CLAY (SP-SC); grey, fine, gap graded, medium dense, moist, -HCL, with shells		SS-19	☒	12-16-14 (N = 30)
60		162			
	CLAYEY SILT (ML/CL); grey, nonplastic, stiff, dry, -HCL, with some shells		SS-20	☒	5-5-6 (N = 11)
65		157			
	SAND WITH CLAY (SP-SC); grey, dense, dry, -HCL, with shells		SS-21	☒	14-17-20 (N = 37)
70		152			
	SAND WITH SILT (SP-SM); grey, intermittent shell layers, fine to medium, dense, wet, -HCL		SS-22	☒	13-19-17 (N = 36)
75		147			
	Same as above, no shells present		SS-23	☒	16-30-17 (N = 47)
80		142			
	Lost circulation at 83.5' Same as above, very loose		SS-24	☒	WOR
85		137			
	Top of Utley Limestone SHELL HASH (GP); tan and brown, subangular, very dense with 80% shells, wet, +HCL		SS-25	☒	30-50/5"
90		132			
	Top of Lisbon Formation (Blue Bluff Marl) at 93 feet SILT (ML) - green and grey, nonplastic, hard, fissured, dry, +HCL		SS-26	☒	20-50/5"
95		127			
			SS-27	☒	50/4"
100		122			



DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7661.92, E 6220.42 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

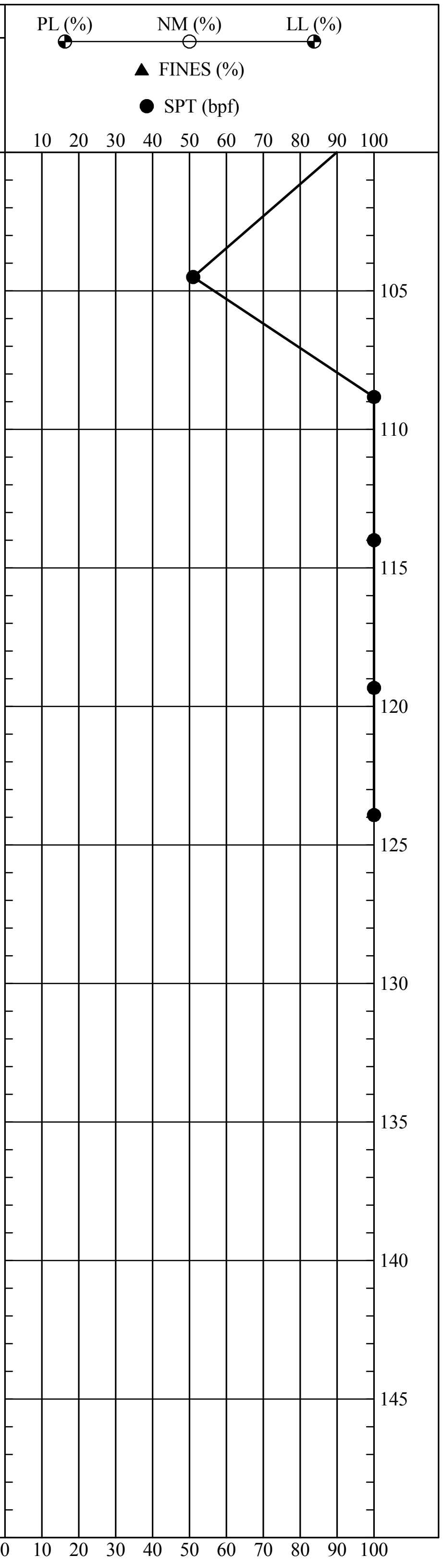
ELEVATION (ft) = 221.64
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1001
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"
100	SILT (ML) - green and grey, nonplastic, hard, fissured, dry, +HCL		122			
	CLAYEY SILT (ML/CL); grey, nonplastic, hard, with <5% shells, dry			SS-28		15-23-28 (N = 51)
105			117			
	Same as above, contains very fine sand			SS-29		50/4"
110			112			
				SS-30		50/6"
115			107			
	Same as above, contains green cemented fragments			SS-31		29-50/4"
120			102			
				SS-32		50/5"
	Boring Terminated at 123.9' on 8/31/05					
125			97			
130			92			
135			87			
140			82			
145			77			
150			72			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7661.92, E 6220.42 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL
	ELEVATION (ft) = 221.64
	ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

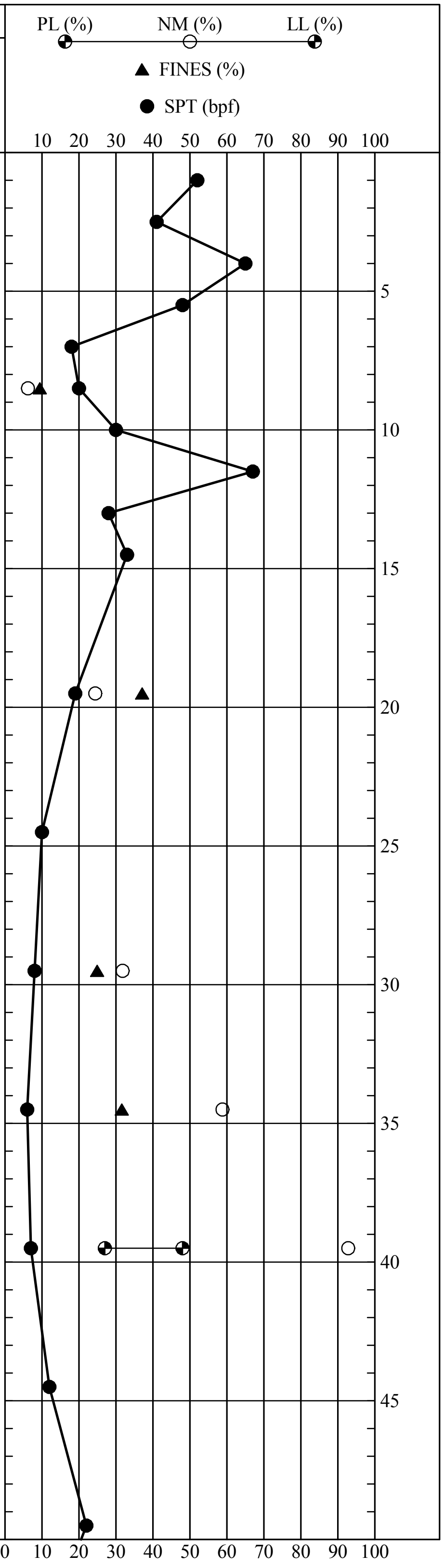
BORING NO.: B-1001
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

SOIL TEST BORING RECORD

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	SAMPLES N-COUNT (1st 6" 2nd 6" 3rd 6")
0	CRUSHED STONE with fines	222		
	SAND WITH SILT (SP-SM); medium brown, very dense (FILL)		SPT-1	13-30-22 (N = 52)
	Same as above, dense (FILL)		SPT-2	16-19-22 (N = 41)
	Same as above, very dense (FILL)		SPT-3	28-31-34 (N = 65)
5	Same as above, light brown, dense (FILL)	217	SPT-4	9-22-26 (N = 48)
	6" CHALK, white (FILL)		SPT-5	6-8-10 (N = 18)
	3" CRUSHED STONE with fines (FILL)			
	SILTY SAND (SM); light brown, firm		SPT-6	8-10-10 (N = 20)
	Barnwell Group at 9'		SPT-7	15-10-20 (N = 30)
10		212		
	Same as above, medium and light brown, very firm		SPT-8	22-28-39 (N = 67)
	Same as above, orange and light brown, very dense			
	Same as above, mottled medium and light brown, firm		SPT-9	10-14-14 (N = 28)
	Same as above, dense		SPT-10	15-15-18 (N = 33)
15		207		
	Same as above, firm with traces of light brown clay		SPT-11	8-9-10 (N = 19)
20		202		
	Same as above, laminated medium brown and grey		SPT-12	5-5-5 (N = 10)
25		197		
	SILTY SAND (SM); mottled light and bedium brown, loose, fine		SPT-13	3-3-5 (N = 8)
30	Same as above, band of light brown clay	192		
	SILTY SAND (SM); light brown, firm, blocky		SPT-14	2-2-4 (N = 6)
35		187		
	Same as above, mottled layers of light brown, firm SILTY CLAY (CL-ML) and medium brown CLAYEY SILT (ML/CL)		SPT-15	1-2-5 (N = 7)
40		182		
	No Recovery		SPT-16	3-5-7 (N = 12)
45		177		
	SAND WITH SILT (SP-SM); light brown, very firm		SPT-17	10-12-10
50		172		



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 221.98

ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

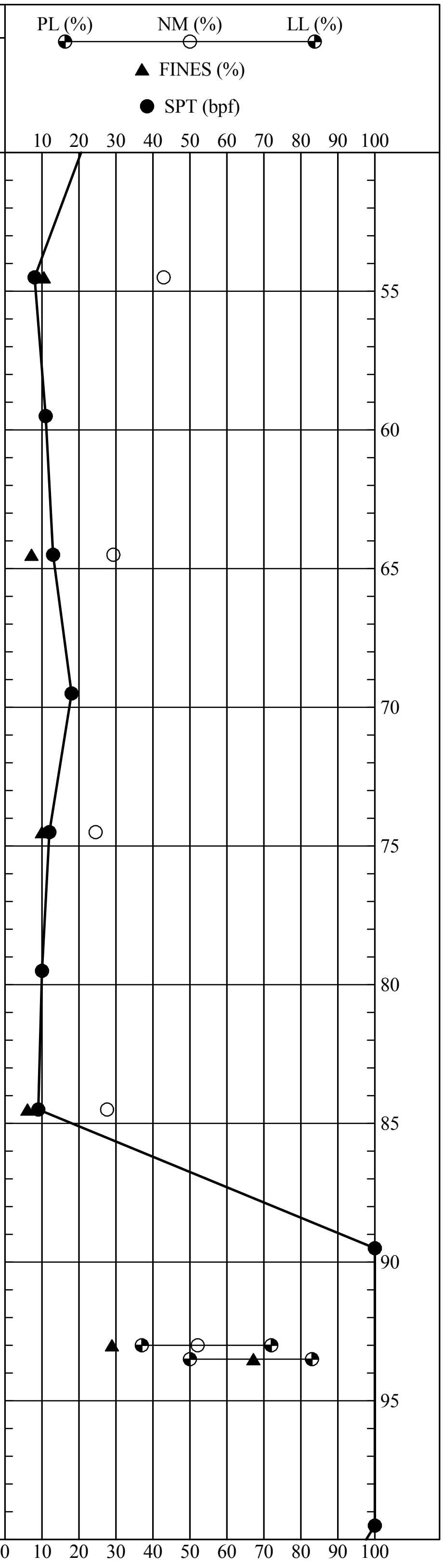
BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 6

MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	SAND WITH SILT (SP-SM); light brown, very firm	172			(N = 22)
	SILTY SAND (SM); light brown, loose		SPT-18	☒	4-4-4 (N = 8)
55	▼	167			
	SAND WITH SILT (SP-SM); light brown, firm		SPT-19	☒	5-5-6 (N = 11)
60		162			
	SILTY SAND (SM); light brown, firm		SPT-20	☒	6-7-6 (N = 13)
65		157			
			SPT-21	☒	9-8-10 (N = 18)
70		152			
	Same as above, pink, grey and light brown, firm Lost circulation at 75'		SPT-22	☒	4-4-8 (N = 12)
75		147			
	SANDY SILTY CLAY (CL-ML); light brown, firm		SPT-23	☒	3-4-6 (N = 10)
80		142			
	SILTY SAND (SM); tan and brown, loose, subrounded, fine, wet, -HCL		SPT-24	☒	4-4-5 (N = 9)
85		137			
	Top of Lisbon formation (Blue Bluff Marl) at 88' SANDY SILT (ML); dark green and grey and tan, low plasticity, hard, dry, +HCL, contains cemented layers Pocket Penetrometer = 2.5 tsf		SPT-25	☒	33-27-50/5"
90		132			
	SANDY ELASTIC SILT (MH); dark greenish gray, hard, fine, some small white shell fragments, contains cemented layers and nodules		UD-1	■	
95	Changed to an 8" roller cone bit, redrilled hole and installed 90' of 6" PVC casing	127			
	Same as above		SPT-26	☒	15-18-50/1"
100		122			



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 221.98

ELEVATION DATUM = NAVD 88

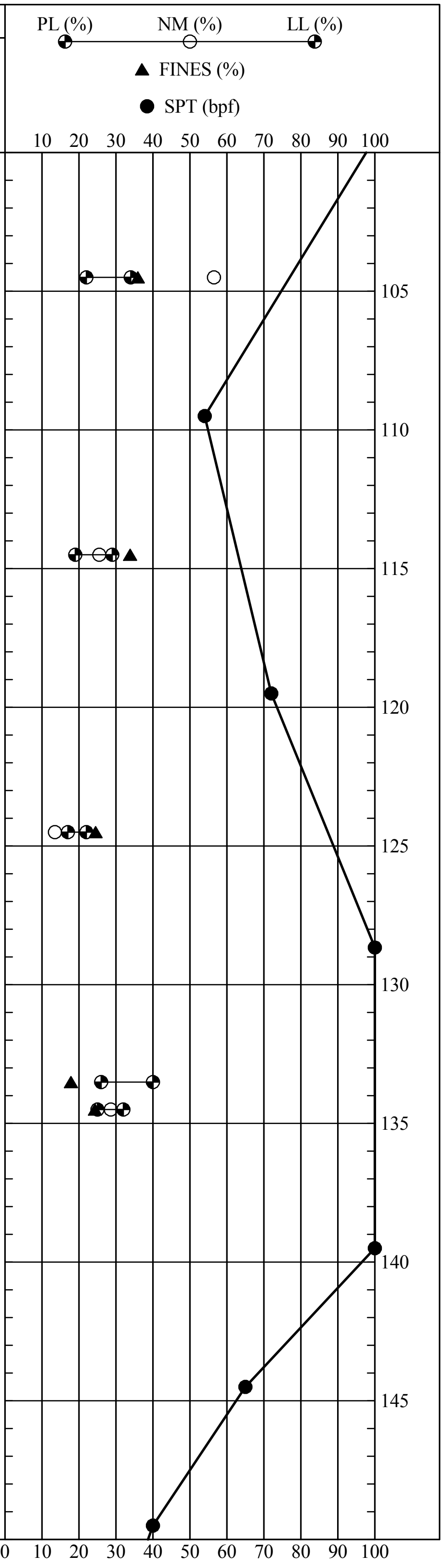
SOIL TEST BORING RECORD

BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 6

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)
100	Pocket Penetrometer = >4.5 tsf, 4.25 tsf, 4.5 tsf, 4.25 tsf and 4.25 tsf SANDY SILTY CLAY (CL); dark green and grey and tan, low plasticity, hard, dry, +HCL, contains cemented layers	122
105		117
110		112
115	CLAYEY SAND (SC); dark green, grey, tan, hard, dry, contains cemented layers and nodules, fine quartz sand with some heavy black minerals observed under 20X hand lens	107
120	Pocket Penetrometer = 2.75 tsf, 1.5 tsf and 2.5 tsf	102
125	FOSSILIFEROUS LIMESTONE; dark greenish gray , hard, dry, moderately cemented, some sandy SILT (ML), some shells	97
130		92
135		87
140	SILTY SAND (SM); dark green and gray, dry, hard, cemented layers and nodules, +HCL	82
145	Pocket Penetrometer = 3.0 tsf, 4.25 tsf and 0.75 tsf	77
150	Pocket Penetrometer = 0.75 tsf, 1.5 tsf, 1.25 tsf and 1.25 tsf	72

SAMPLES IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")
UD-2	
SPT-27	18-21-33 (N = 54)
UD-3	
SPT-28	26-34-38 (N = 72)
UD-4	
SPT-29	50/2"
UD-5	
SPT-30	10-28-50/2"
SPT-31	32-32-33 (N = 65)
SPT-32	15-18-22



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 221.98
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

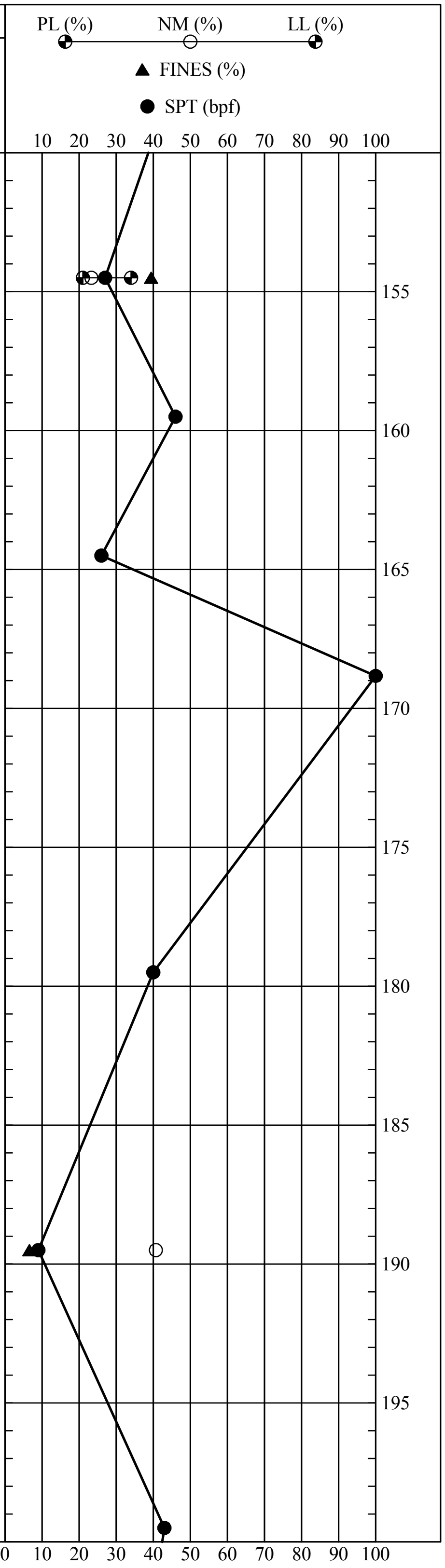
BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

SOIL CLASSIFICATION AND REMARKS	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
Same as above			(N = 40)
SANDY CLAY (CL); gray, very stiff, cemented layers/nodules, trace shell hash, +HCL Pocket Penetrometer = 1.25 tsf, 0.75 tsf, 1.25 tsf, 3.5 tsf and 1.75 tsf	SPT-33	☒	21-12-15 (N = 27)
Top of Still Branch Formation at 157' CLAYEY SILT (ML/CL) - grey, hard, traces of shells	SPT-34	☒	12-20-26 (N = 46)
SILTY CLAYEY SAND (SC-SM); dark green, very stiff, +HCL	SPT-35	☒	16-14-12 (N = 26)
SAND WITH SILT (SP-SM); dark green and grey, very dense, +HCL	SPT-36	☒	50/4"
Same as above, contains shell hash	SPT-37	☒	15-15-25 (N = 40)
SILTY SAND (SM); dark grey, loose, fine, -HCL	SPT-38	☒	2-1-8 (N = 9)
SAND (SP); dark grey, dense, fine	SPT-39	☒	8-15-28

DEPTH (ft)	ELEV (ft)
150	72
155	67
160	62
165	57
170	52
175	47
180	42
185	37
190	32
195	27
200	22



DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 221.98

ELEVATION DATUM = NAVD 88

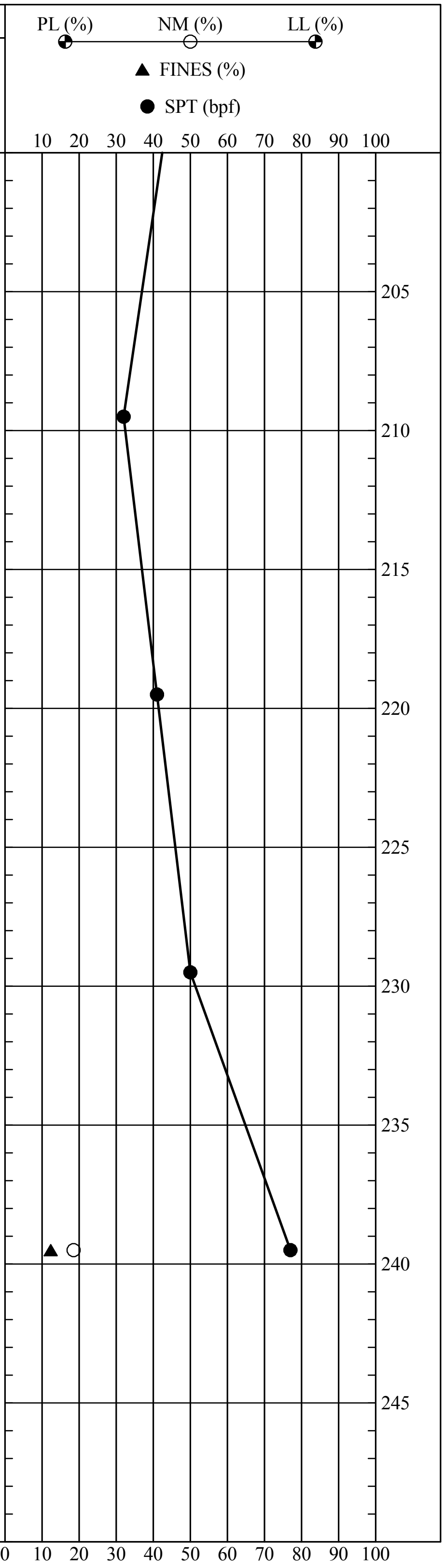
SOIL TEST BORING RECORD

BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 4 **OF** 6

MACTEC

DEPTH (ft)	ELEV (ft)
200	22
205	17
210	12
215	7
220	2
225	-3
230	-8
235	-13
240	-18
245	-23
250	-28

SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SAND (SP); dark grey, dense, fine			(N = 43)
SILT (ML); dark grey, hard	SPT-40	☒	14-18-14 (N = 32)
SAND WITH SILT (SP-SM); dark grey, dense	SPT-41	☒	7-14-27 (N = 41)
SAND WITH SILT (SP-SM); dark grey, dense, fine to medium with seams of SANDY SILT, -HCL	SPT-42	☒	13-23-27 (N = 50)
Top of Congaree Formation at 235' SILTY SAND (SM); white, very dense, fine to medium with silt and cemented sand grains and pyrite Drilling advanced to 260' for suspension logging purposes.	SPT-43	☒	23-34-43 (N = 77)



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 221.98

ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 5 **OF** 6

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6"	N-COUNT 2nd 6"	N-COUNT 3rd 6"	PL (%) ● NM (%) ○ LL (%) ● ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
250	Top of Congaree Formation at 235' SILTY SAND (SM); white, very dense, fine to medium with silt and cemented sand grains and pyrite Drilling advanced to 260' for suspension logging purposes.		-28						
255			-33						255
260	Boring Terminated at 260' on 9/21/05		-38						260
265			-43						265
270			-48						270
275			-53						275
280			-58						280
285			-63						285
290			-68						290
295			-73						295
300			-78						0 10 20 30 40 50 60 70 80 90 100

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7998.52, E 6985.47 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05
	ELEVATION (ft) = 221.98
	ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1002
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 6 **OF** 6

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6"	N-COUNT 2nd 6"	N-COUNT 3rd 6"	PL (%) ● NM (%) ○ LL (%) ● ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
0	This boring was created for P-S wave suspension logging. No material sampling was performed.		222						
5			217						5
10			212						10
15			207						15
20			202						20
25			197						25
30			192						30
35			187						35
40			182						40
45	▼		177						45
50	P-S Suspension logging was attempted from 49 to 69 feet. P-S Suspension logging was terminated on 10/5/05 after the tool became locked in the hole due to the presence of thick cuttings.		172						0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7985.62, E 6986.07 Water depth represents depth of water and mud as measured on 10/5/05. Hole caved to 56 feet 10/5/05.
	ELEVATION (ft) = 222.27
	ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1002A
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 23, 2005
PROJECT NO.: 6141-05-0227

PAGE 1 **OF** 3

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6"	N-COUNT 2nd 6"	N-COUNT 3rd 6"	10 20 30 40 50 60 70 80 90 100
50			172						
55			167						55
60			162						60
65			157						65
70	Boring terminated at 70 feet on 9/23/05 to perform Geophysical logging.		152						70
75			147						75
80			142						80
85			137						85
90			132						90
95			127						95
100			122						0 10 20 30 40 50 60 70 80 90 100

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7985.62, E 6986.07 Water depth represents depth of water and mud as measured on 10/5/05. Hole caved to 56 feet 10/5/05.
	ELEVATION (ft) = 222.27
	ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1002A
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 23, 2005
PROJECT NO.: 6141-05-0227

PAGE 2 **OF** 3

MACTEC

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6"	N-COUNT 2nd 6"	N-COUNT 3rd 6"
100	Boring terminated at 70 feet on 9/23/05 to perform Geophysical logging.		122					
105	Boring terminated at 105 feet on 9/26/05 Boring cleaned out on 10/5/05 (using a CME-75 Auto-Hammer) and flushed with 300 gallons of drilling mud with no return to the surface. Mud level depth measured at 49 feet after removal of rods.		117					
110			112					
115			107					
120			102					
125			97					
130			92					
135			87					
140			82					
145			77					
150			72					

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100

DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7985.62, E 6986.07
Water depth represents depth of water and mud as measured on 10/5/05. Hole caved to 56 feet 10/5/05.

ELEVATION (ft) = 222.27
ELEVATION DATUM = NAVD 88

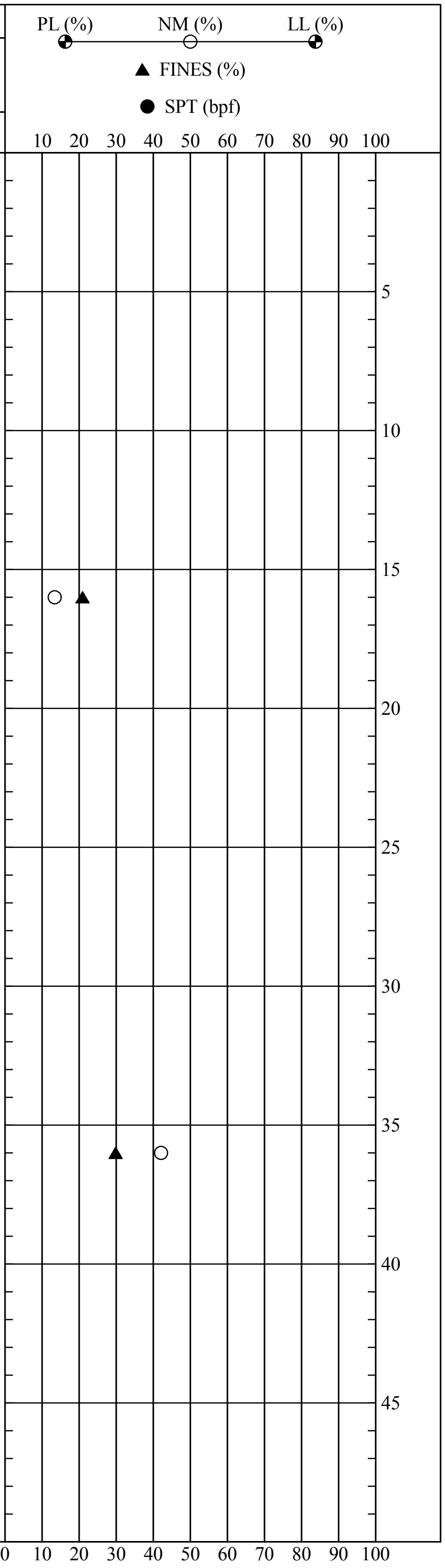
SOIL TEST BORING RECORD

BORING NO.: B-1002A
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 23, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
0	TOP OF BARNWELL FORMATION AT 0 FEET. DRILL OUT 0 TO 5 FEET TO SET CORE BARREL AND BIT. BEGIN CHRISTENSEN 94 MM WIRE LINE CORING WITH SPEEDSTAR QUICKDRILL 275 DRILL RIG AT 5 FEET.		223			
5	SILTY SAND (SM) - tan-red-gray, subangular, fine to medium, moist, seams of gray clayey sand, -HCl.		218	DCS-1		100
10			213	DCS-2		80
15	SILTY SAND (SM) - red-tan, subangular, fine to coarse, moist to wet, quartz, -HCl.		208	DCS-3		80
20	LEAN CLAY WITH SAND (CL) - white-gray, low to medium plasticity, dry, fine to medium sand, -HCl. CLAYEY SAND (SC) - tan and red, subangular to angular, medium to coarse, moist, thin laminations of clay from 24 to 25 feet, -HCl.		203	DCS-4		100
25	SAND WITH CLAY (SC) - tan, subangular, fine to medium, moist, thin laminations of tan lean clay, -HCl.		198	DCS-5		60
30	SANDY SILT (ML) - tan, low plasticity, fine sand, moist, laminated structure, black manganese staining, -HCl.		193	DCS-6		100
35	SILTY SAND (SM) - tan, subangular, fine to medium, moist, quartz, black manganese staining, -HCl.		188	DCS-7		100
40	CLAYEY SAND (SC) - tan, subrounded, fine to very fine, moist, seams of tan laminated silt from 45 to 48 feet, -HCl.		183	DCS-8		100
45	CLAYEY SAND (SC) - light greenish white, subrounded to subangular, fine to medium, moist, silicified/cemented chunks and large oyster shell fragments, -HCl		178	DCS-9		100
50			173			



DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

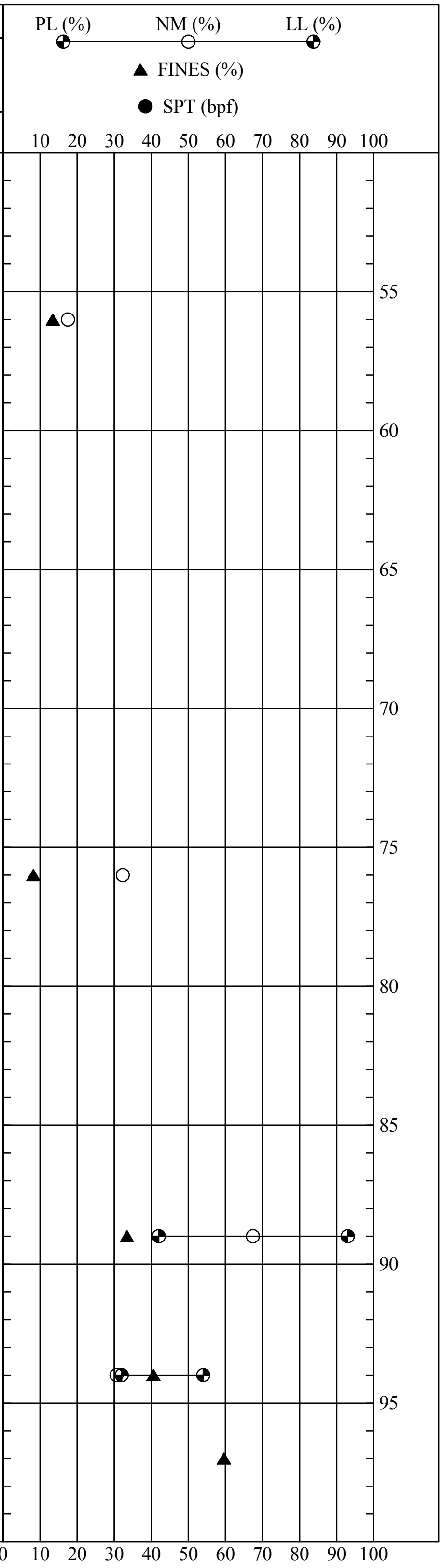
SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 27

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
50	SAND WITH SILT (SM) - light green, subangular to subrounded, fine to medium, moist, calcareous sand, trace shell hash, +HCl.		173	DCS-10		100
55	CLAYEY SAND (SC) - white-light green, subrounded, fine to medium, moist to wet, shell hash, silicified/cemented layers, large oyster shell fragments, +HCl.		168	DCS-11		100
60			163	DCS-12		100
65	LOST CIRCULATION AT 60 FEET. BOREHOLE REAMED WITH 9 7/8 INCH TRI-CONE BIT TO 68.5 FEET TO SET 6-INCH ID SCHEDULE 40 PVC CASING. OVERDRILLED TO 70 FEET TO RESUME CHRISTENSEN 94 MM WIRE LINE CORING.		158	NR	○	0
70	SAND WITH SILT (SM) - light green, subangular, fine to medium, wet, calcareous sand, light green and brown banding at 79 feet, +HCL.		153	DCS-13		100
75			148	DCS-14		100
80	SANDY LEAN CLAY (CL) - brown-dark green, medium plastic, coarse subangular quartz sand, brown and green laminations, -HCl. TOP OF UTLEY LIMESTONE AT 80.5 FEET. HARD DRILLING 80 TO 84 FEET. CLAYEY SAND (SC) - white-light tan, subangular sand, coarse, gravel-sized fragments of cemented shell hash, calcareous sand, moist to wet, +HCl.		143	DCS-15		100
85	SILTY CLAY (CL-ML) - white, low plasticity, very had cemented laminated layers, zones of cemented shell hash, +HCL. TOP OF LISBON FORMATION (BLUE BLUFF MARL) AT 86 FEET		138	DCS-16		75
90	SILTY SAND (SM) - dark green-gray, nonplastic, hard, dry to moist, +HCl, laminated structure, some shell hash. BROKE SEAL ON CASING AT 96 FEET. BOREHOLE REAMED WITH 9 7/8" ROLLER CONE BIT TO 88 FEET. 6" SCHEDULE 40 PVC CASING INSTALLED TO A DEPTH OF 88 FEET 9/1/05. CASING GROUTED IN PLACE.		133	DCS-17		60
95			128	UD-1		100
	SANDY SILT (ML) - gray 2 to 4 inch layers of moderately hard FOSSILIFEROUS LIMESTONE from 96 to 98 feet. HARD DRILLING 96 to 98.7 FEET.			DCS-18		85
				DCS-19		57
100			123			



DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 27

MACTEC

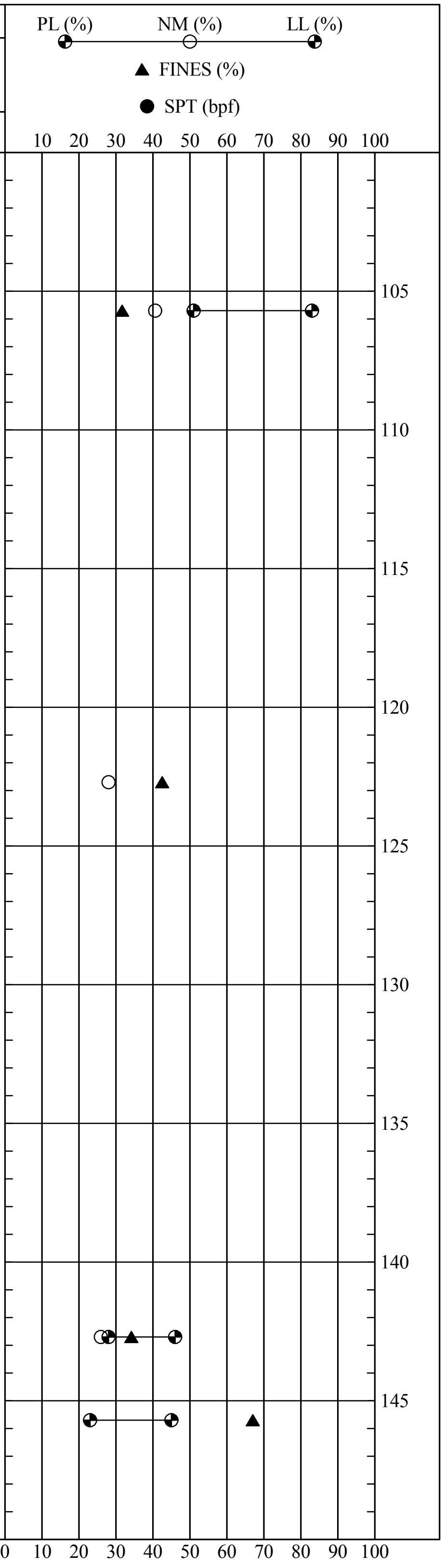
SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
100	SWITCHED TO DIAMOND ROCK CORING BIT AT 98.7 FEET. FOSSILIFEROUS LIMESTONE - light greenish gray, soft to hard, some shell fragments and black phosphatic fragments in matrix, some seams of sandy silt observed from 104.7 to 106.7.	123
105	SWITCHED BACK TO DRAG-TYPE SOIL CORING BIT AT 109.7 FEET. HARD DRILLING 109.7 TO 113.7 SILTY SAND (SM) - greenish gray, nonplastic, very hard, contains subrounded to subangular sand, strongly cemented, 1 to 2 inch layers of hard FOSSILIFEROUS LIMESTONE from 109.7 to 113.7, contains shell hash and black phosphatic fragments.	118
110		113
	SILTY SAND (SM) - greenish gray, highly plastic, firm, moist, shell hash, 1 to 3 inch layers of hard FOSSILIFEROUS LIMESTONE, LIMESTONE layers becoming less prevalent from 126.7 to 136.7.	
115		108
120		103
125		98
130		93
135		88
	SILTY SAND (SM) - greenish gray, nonplastic, hard, moist, trace shell hash, contains fine sand, 1 to 3 inch layers of FOSSILIFEROUS LIMESTONE throughout.	
140		83
145		78
	SANDY LEAN CLAY (CL) - light gray	
150		73

SAMPLES

IDENT	TYPE	N-COUNT 1st 6"	2nd 6"	3rd 6"	RQD	% REC
DCS-20						4
DCS-21						20
DCS-22					95	95
DCS-23						33
DCS-24						100
DCS-25						81
DCS-26						100
DCS-27						100
DCS-28						100
DCS-29						44
DCS-30						100
DCS-31						100
DCS-32						88



DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 27

MACTEC

SOIL CLASSIFICATION AND REMARKS

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DEPTH (ft)	ELEV (ft)
150	73
155	68
160	63
165	58
170	53
175	48
180	43
185	38
190	33
195	28
200	23

TOP OF STILL BRANCH FORMATION AT 149 FEET.
SAND WITH SILT (SM) - dark green, poorly graded, subangular, fine to coarse, dense, brown banding, wet, top 6 inches consists of CLAYEY SAND (SC) contact zone, weak +HCl reaction.

SAND (SP) - gray, subrounded to subangular, fine to medium, wet.

CLAYEY SAND (SC) - dark greenish black, subrounded to subangular, medium to coarse, wet.

SAND WITH SILT (SM) - gray, subrounded, fine to medium, wet, quartz, weak +HCl reaction. HARD DRILLING 160.7 TO 161.2 FEET.

CLAYEY SAND (SC) - black, subangular to subrounded, fine to medium, quartz, weak +HCl reaction.

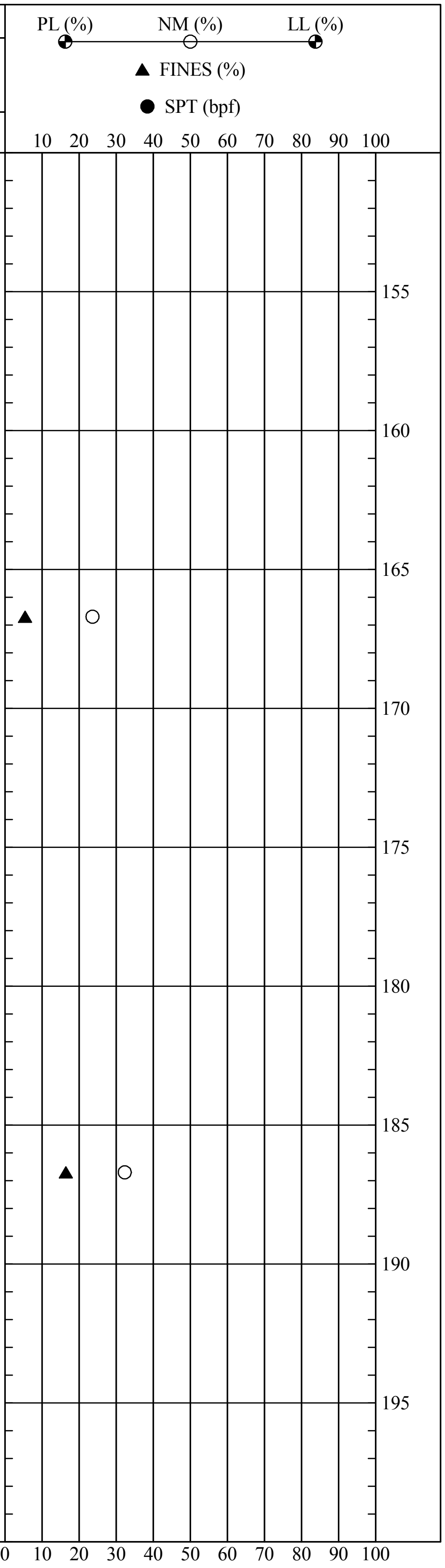
SILTY SAND (SM) - dark greenish gray, subrounded to subangular, fine to medium, dense, quartz, wet, weak +HCl reaction, some zones of CLAYEY SAND (SC) from 195.2 to 195.7.

CLAYEY SAND (SC) - dark gray, subangular, fine to coarse, wet, quartz.

SAND (SP) - light gray, subangular, medium to coarse, wet, quartz.

SAMPLES

IDENT	RQD / % REC
DCS-33	86
DCS-34	100
DCS-35	100
DCS-36	100
DCS-37	100
DCS-38	100
DCS-39	100
DCS-40	100
DCS-41	100
DCS-42	70



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
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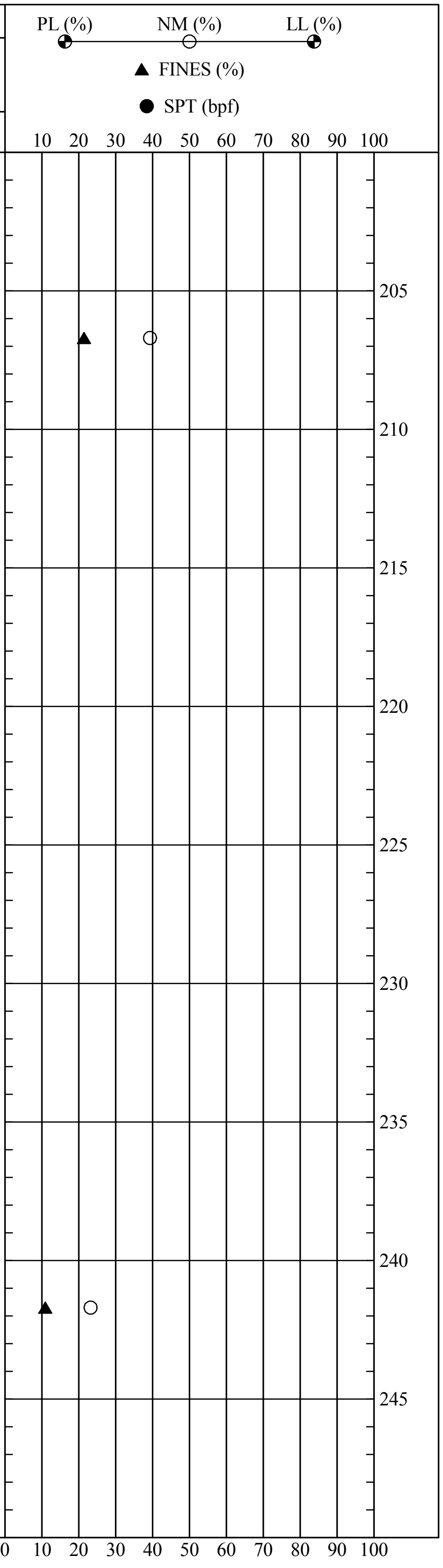
SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 4 **OF** 27

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
200	SAND (SP) - light gray, subangular, medium to coarse, wet, quartz.	23			
			DCS-43		100
205		18			
	SILTY SAND (SM) - dark greenish gray, medium plasticity, laminated structure, hard, seams of coarse quartz sand 1 to 3 inches thick.				
			DCS-44		50
210		13			
			DCS-45		48
215		8			
	TOP OF CONGAREE FORMATION AT 215.7 FEET. SAND WITH SILT (SM) - gray, subangular, medium to coarse, wet, some large grains of coarse quartz gravel > 1/4 inch in diameter, 1 inch lignite fragment observed at 226 feet.				
			DCS-46		94
220		3			
			DCS-47		100
225		-2			
			DCS-48		86
230		-7			
			DCS-49		64
235		-12			
			DCS-50		100
240		-17			
	SAND WITH SILT (SM) - light gray and white, subangular, dense, quartz, mica (muscovite), white kaolinitic matrix, trace feldspar, light pink color at 245.7 feet, becomes very coarse at 255 feet.				
			DCS-51		94
245		-22			
			DCS-52		100
250		-27			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

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SOIL TEST BORING RECORD

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PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
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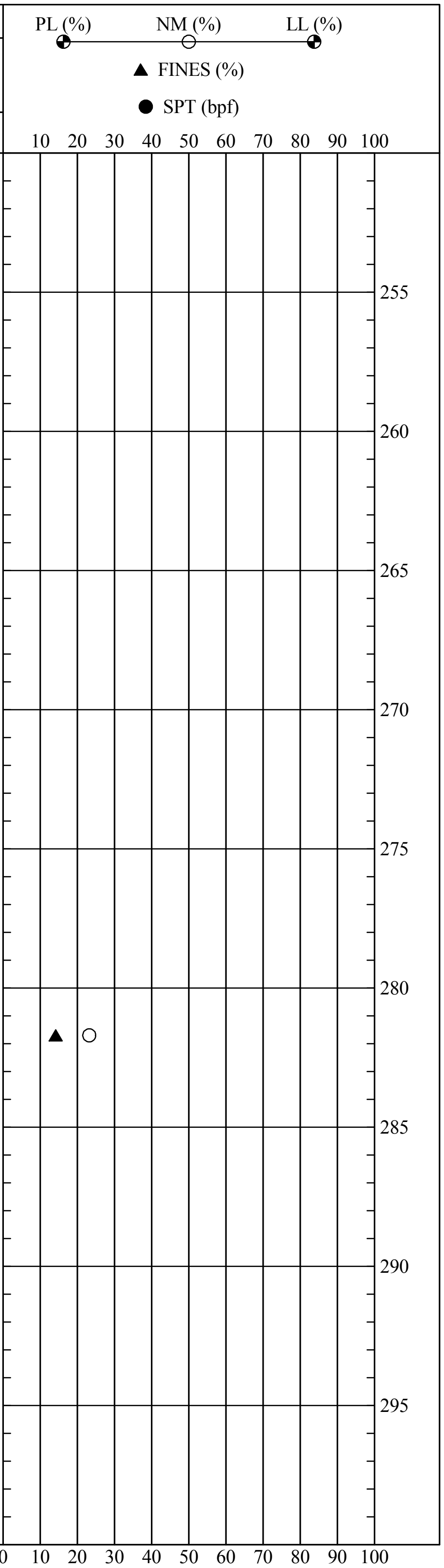
MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)
250	SAND WITH SILT (SM) - light gray and white, subangular, dense, quartz, mica (muscovite), white kaolinitic matrix, trace feldspar, light pink color at 245.7 feet, becomes very coarse at 255 feet.	-27
255	SANDY SILT (ML) - light gray-white, low plasticity, very stiff, moist, mica, angular quartz.	-32
260		-37
	SAND WITH SILT (SM) - light gray, subangular, medium to coarse, wet, quartz, trace mica, trace feldspar.	
265		-42
270		-47
275		-52
280	SILTY SAND (SM) - gray, subangular to subrounded, wet, mica, trace feldspar, some coarse subangular quartz gravel observed from 285.7 to 289.7.	-57
285		-62
290	SANDY FAT CLAY (CH) - black, medium to highly plastic, hard, dry, mica.	-67
	SAND WITH SILT (SM) - black, subangular, fine to coarse, wet, quartz, mica, greenish glauconitic zones 300.7 to 305.7, lignite fragment at 304 feet, becomes interlayered with 3 to 5 inch seams of dark grayish black, seam of medium plastic hard FAT CLAY (CH) at 310.7.	
295		-72
300		-77

SAMPLES IDENT	RQD / % REC
DCS-53	86
DCS-54	100
DCS-55	100
DCS-56	100
DCS-57	90
DCS-58	100
DCS-59	90
DCS-60	90
DCS-61	90
DCS-62	88



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: GRAVES DRILLING (STEVE RODGERS)
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DRILLED: September 1, 2005
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MACTEC

DEPTH (ft)	ELEV (ft)
300	-77
305	-82
310	-87
315	-92
320	-97
325	-102
330	-107
335	-112
340	-117
345	-122
350	-127

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

SAND WITH SILT (SM) - black, subangular, fine to coarse, wet, quartz, mica, greenish glauconitic zones 300.7 to 305.7, lignite fragment at 304 feet, becomes interlayered with 3 to 5 inch seams of dark grayish black, seam of medium plastic hard FAT CLAY (CH) at 310.7.

CLAY WITH SAND (CL) - dark grayish black, medium plasticity, hard, moist, 1 to 2 inch seams of fine quartz sand, mica (muscovite).

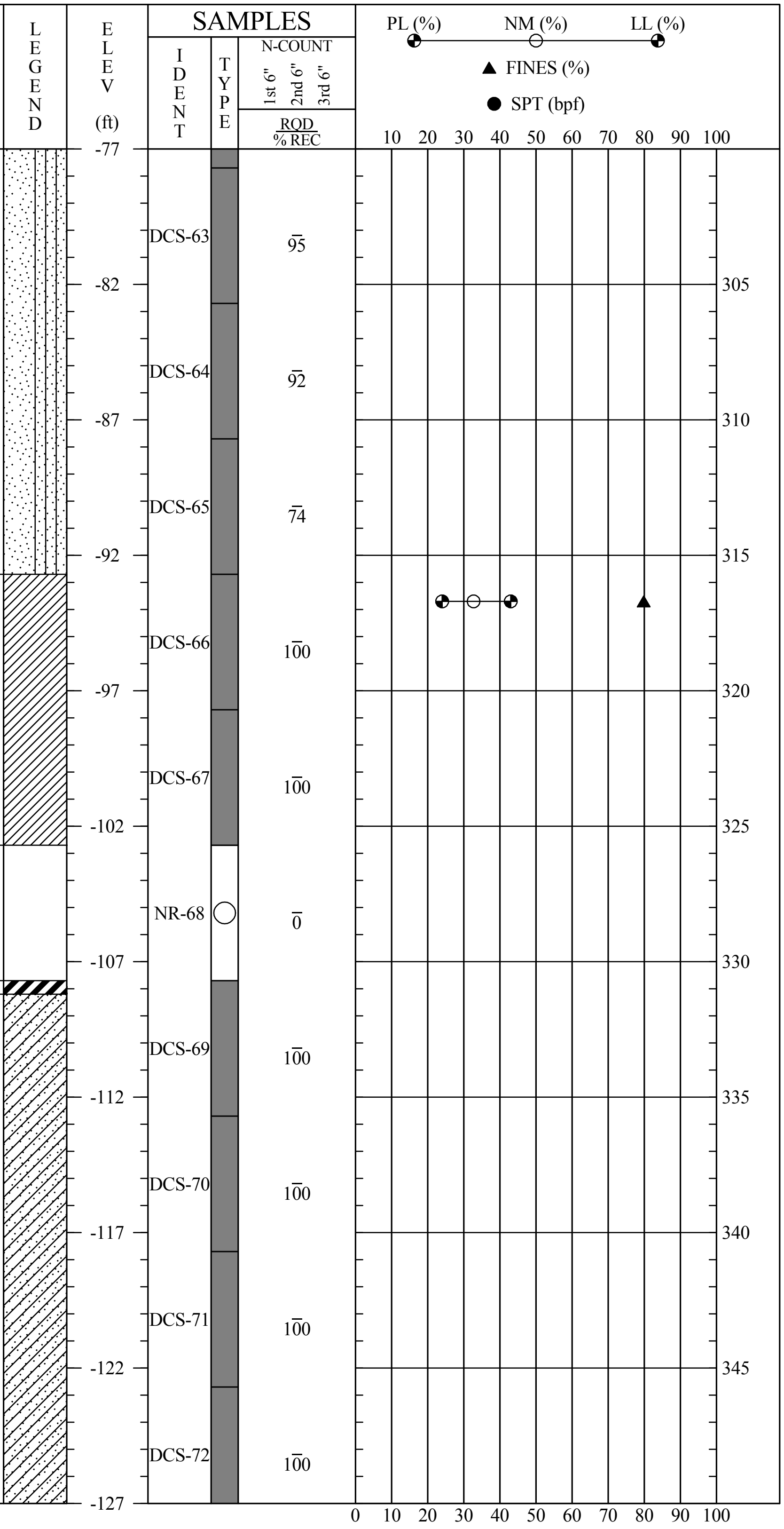
NO RECOVERY, sampler did not go to bottom of core pipe, drilling indicated hard clay with sand seams.

SANDY FAT CLAY (CH) - dark grayish black, medium plasticity, hard, moist, 1 to 2 inch seams of fine quartz sand, mica (muscovite).

TOP OF SNAPP FORMATION AT 331.2 FEET. CLAYEY SAND (SC) - light grayish white, subangular, medium to coarse, dense, moist to wet, quartz+feldspar+mica, kaolinitic clay matrix, some light gray hard SANDY SILT (ML) observed at 350.7.

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" / 2nd 6" / 3rd 6") RQD / % REC
DCS-63		95
DCS-64		92
DCS-65		74
DCS-66		100
DCS-67		100
NR-68	○	0
DCS-69		100
DCS-70		100
DCS-71		100
DCS-72		100



DRILLER: GRAVES DRILLING (STEVE RODGERS)
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
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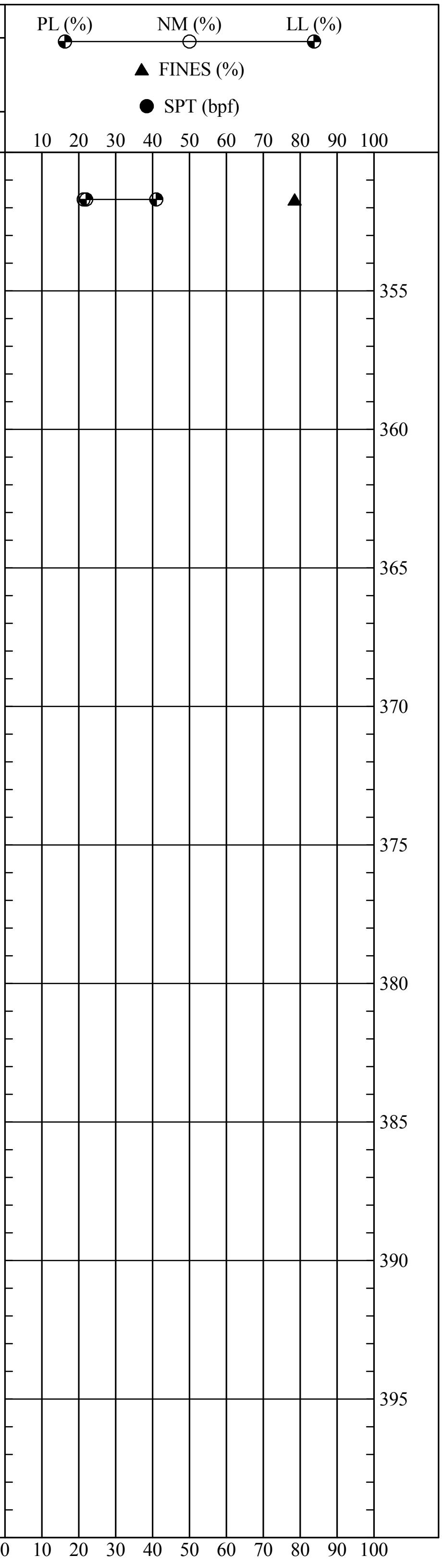
MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" RQD % REC
350			-127			
	SANDY FAT CLAY (CH) - gray-reddish brown, highly to medium plastic, very hard, moist, fine to medium quartz sand, mica, mottled.					
				DCS-73		95
355			-132			
	CLAYEY SAND (SC) - gray-reddish brown, subangular, fine to coarse, quartz+feldspar+mica, grades from coarse to fine from bottom to top of run.					
				DCS-74		100
360			-137			
	SILTY SAND (SM) - gray-white, subangular, fine to medium, wet, quartz+mica+feldspar, kaolinitic clay matrix.					
				DCS-75		92
365			-142			
				DCS-76		100
370			-147			
				DCS-77		74
375			-152			
				DCS-78		86
380			-157			
	SILTY CLAY (CL-ML) - gray-red-brown, low plasticity, mottled.					
				DCS-79		100
385			-162			
				DCS-80		100
390			-167			
	SANDY LEAN CLAY (CL) - gray, subangular quartz.					
	CLAYEY SAND (SC) - gray, medium, subangular quartz.					
				DCS-81		98
395			-172			
	SILTY SAND (SM) - gray, fine to medium, subangular quartz.					
				DCS-82		84
400			-177			



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SOIL TEST BORING RECORD

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PROJECT NO.: 6141-05-0227 **PAGE** 8 **OF** 27

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	ELEV (ft)
400	-177
405	-182
410	-187
415	-192
420	-197
425	-202
430	-207
435	-212
440	-217
445	-222
450	-227

SILTY SAND (SM) - gray, fine to medium, subangular quartz.

SILTY CLAY (CL-ML) - gray-red, some 4 to 6 inch layers of white and gray fine to coarse slightly silty quartz sand from 415.7 to 425.7, slickensided surface observed at 418.5 feet. BEGAN DRILLING WITH GARDNER DENVER 15W DRILL RIG AT 415.7 FEET.

SAND WITH SILT (SM) - tan-gray, subrounded to subangular, fine to medium, wet, quartz, mica, 3 to 4 inch seams of reddish brown SANDY SILT (ML).

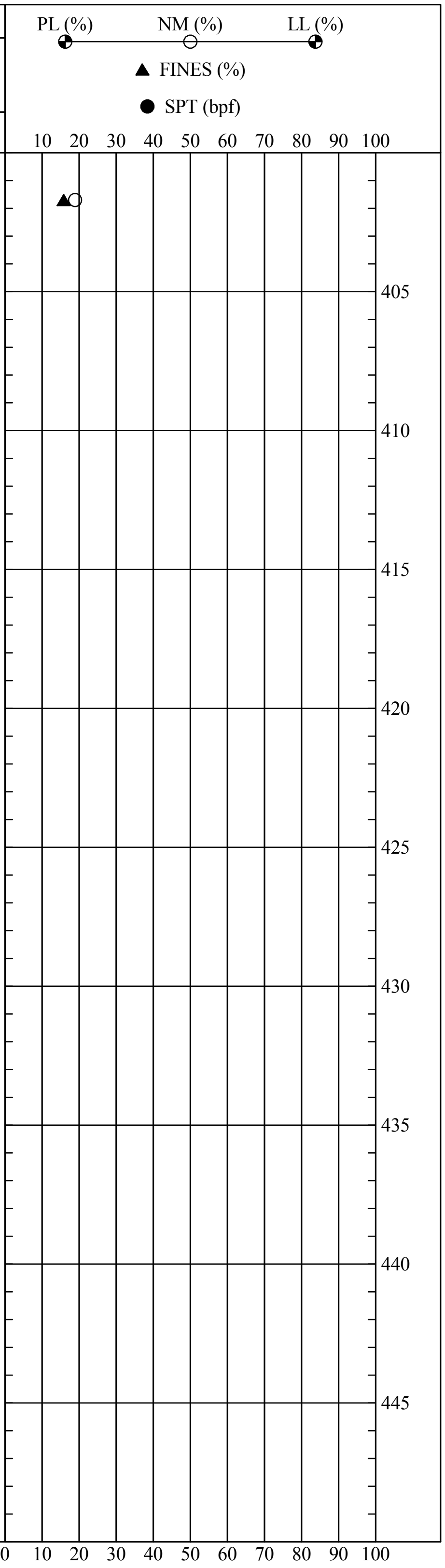
SAND WITH GRAVEL (SP) - subangular, coarse, subangular quartz gravel, likely basal channel lag deposit, sharp contact into dark gray fat clay at 438.

TOP OF BLACK MINGO FORMATION AT 438 FEET. SANDY FAT CLAY (CH) - dark gray, highly plastic, hard, micaceous, laminated structure at bottom of interval at 440.7, zones of lower plasticity at 440.7 to 445.7, 2 to 3 inch seams of fine SILTY SAND (SM) at 440.7 to 445.7, lignite fragments observed at 441 feet. HARD DRILLING 440.7 TO 457.7 FEET.

SAND WITH SILT (SM) - light gray, subrounded to subangular, fine, dense, 1/4 to 1/2 inch laminae of light gray SANDY SILT (ML), some zones of CLAYEY SAND (SC).

SAMPLES

IDENT	RQD	% REC
DCS-83		64
DCS-84		86
DCS-85		86
DCS-85		80
DCS-87		58
DCS-88		66
DCS-89		80
DCS-90		80
DCS-91		90
DCS-92		46



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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
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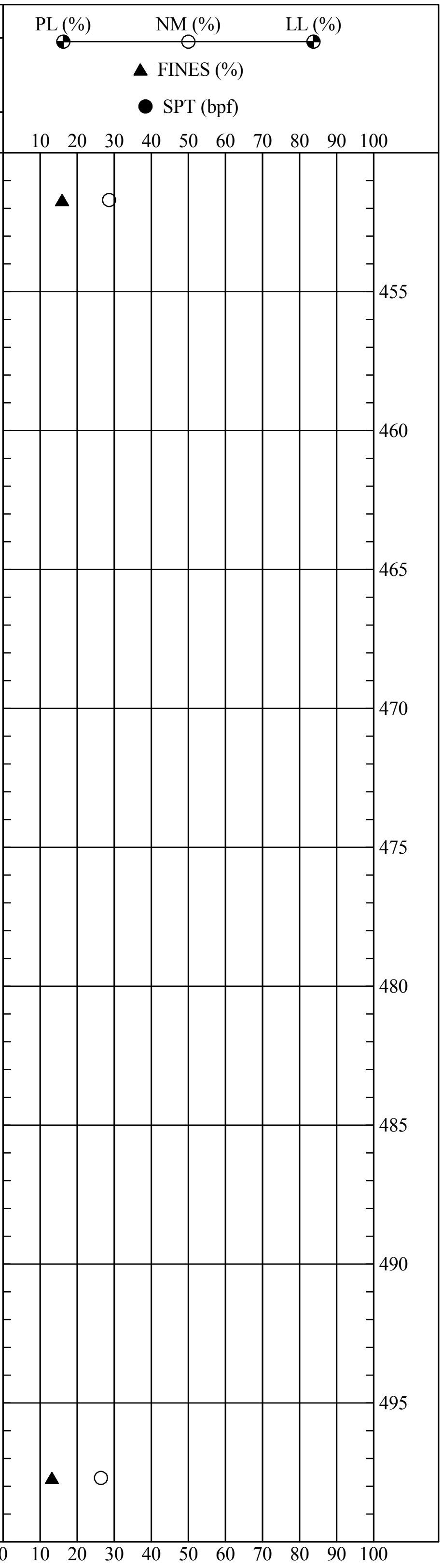
PROJECT NO.: 6141-05-0227 **PAGE** 9 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6") RQD / % REC
450	SAND WITH SILT (SM) - light gray, subrounded to subangular, fine, dense, 1/4 to 1/2 inch laminae of light gray SANDY SILT (ML), some zones of CLAYEY SAND (SC).	-227	DCS-93	88
455	CLAYEY SAND (SC) - light gray, subrounded, fine to medium, dense, moist to wet, quartz, mica, -HCl.	-232	DCS-94	100
	SANDY FAT CLAY (CH) - gray, medium to high plasticity, very hard, very coarse subangular quartz sand, lignite fragments from 461.7 to 472, ~45 degree dipping slickenside observed at 461 feet.			
460		-237	DCS-95	100
465		-242	DCS-96	100
470		-247	DCS-97	94
	CLAYEY SAND (SC) - gray, subrounded to subangular, fine to coarse, wet, quartz, mica, fining upward sequence from 474 to 472.			
475		-252	DCS-98	74
	TOP OF STEEL CREEK FORMATION AT 476.7 FEET. SAND WITH CLAY (SC) - gray, subrounded to subangular, fine to coarse, wet, quartz, mica, kaolinitic clay matrix, some 1/4 to 1/2 inch seams of gray clay at 486.7 to 501.7.		DCS-99	70
480		-257		
485		-262	DCS-100	68
490		-267	DCS-101	60
495		-272	DCS-102	66
500		-277	DCS-103	95



DRILLER: GRAVES DRILLING (STEVE RODGERS)
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MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6" RQD / % REC
500	SAND WITH SILT (SM) - gray, subrounded to subangular, fine to coarse, wet, quartz, mica, kaolinitic clay matrix.	-277		
505		-282	DCS-104	84
510		-287	DCS-105	100
515		-292	DCS-106	100
520	SILTY SAND (SM) - gray to dark gray, subangular to subrounded, fine to medium, wet, quartz, mica, some small to large lignite fragments, strongly cemented coarse quartz sand from 536.7 to 551.7 containing pyrite in matrix.	-297	DCS-107	100
525		-302	DCS-108	100
530		-307	DCS-109	90
535		-312	DCS-110	76
540		-317	DCS-111	5
545		-322	DCS-112	60
550		-327	DCS-113	5

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL
	ELEVATION (ft) = 223.21
	ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 11 **OF** 27

MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	RQD / % REC
550		-327		
	SAND WITH SILT (SM) - gray, subrounded to subangular, fine to coarse, wet, quartz, mica, some lignite, weakly cemented with some very coarse sand at 586.7.			
			DCS-114	80
555		-332		
			DCS-115	60
560		-337		
			DCS-116	60
565		-342		
			DCS-117	60
570		-347		
			DCS-118	80
575		-352		
			DCS-119	60
580		-357		
			DCS-120	70
585		-362		
	TOP OF GAILLARD/BLACK CREEK FORMATION AT 586.7 FEET.			
			DCS-121	40
590		-367		
	NO RECOVERY, loose sand fell through catcher.			
			NR-122 ○	0
595		-372		
	SAND WITH SILT (SM) - gray, subrounded to subangular, fine to coarse, wet, quartz, mica, some lignite.			
			DCS-123	78
600		-377		

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 12 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND
600	SILTY SAND (SM) - gray-tan, subrounded, fine to medium, moist, some 1/4 inch rounded quartz pebbles, bands of glauconitic sand. HARD DRILLING 601.7 TO 611.7 FEET.	▨
602.7	SANDY SILT (ML) - gray, low plasticity, very hard, fine quartz sand, some mica, orange green and yellow oxidation staining, trace coarse sand 611.7 to 616.7, thin seams of coarse CLAYEY SAND (SC) from 616.7 to 621.7, very coarse CLAYEY SAND (SC) from 623 to 626.7. HARD DRILLING 611.7 TO 616.7. CORE RUN TIME = 30 minutes HARD DRILLING 616.7 TO 621.7. CORE RUN TIME = 35 minutes HARD DRILLING 621.7 TO 626.7. CORE RUN TIME = 25 minutes DRILLER NOTED SLIGHTLY SOFTER MATERIAL AT 624.7	▯
626.7	SILTY SAND (SM) - white and gray, subrounded, fine to coarse, wet, loose, quartz, trace mica, fining upward sequences 1 to 2 feet thick from 631.7 to 648, some very coarse quartz sand and pebbles of subrounded quartz from 646.7 to 648.7.	▨
648.7		▨

DEPTH (ft)	ELEV (ft)
600	-377
605	-382
610	-387
615	-392
620	-397
625	-402
630	-407
635	-412
640	-417
645	-422
650	-427

SAMPLES

IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" RQD / % REC
DCS-124	■	76
DCS-125	■	100
DCS-126	■	100
DCS-127	■	86
DCS-128	■	50
DCS-129	■	40
DCS-130	■	98
DCS-131	■	66
DCS-132	■	50
DCS-134	■	40

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
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MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

SAMPLES

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
650	FAT CLAY WITH SAND (CH) - gray to dark gray, medium to highly plastic, angular quartz sand, very hard, orange and yellow oxidation staining 651.7 to 656.7, some oxidation appears to be along relict root channels, 60 degree dipping slickenside observed at 653.7. HARD DRILLING 649.7 TO 651.7. CORE RUN TIME = 30 minutes. ~ 60 degree dipping slickenside observed at 653.7	-427		
655		-432	DCS-135	100
	NO RECOVERY, sampler shoe hung in core pipe and sheared off.			
660		-437	NR-136	10
	SANDY SILT (ML) - gray-red-yellow, low plasticity, very hard, dry, red and yellow oxidation staining, some zones of ELASTIC SILT (MH), arcuate-tangential bedding structures observed from 667.7 to 672.7, seams of light gray fine CLAYEY SAND (SC) from 667.7 to 672.7, abundant mica observed from 677.7 to 682.7, grades into very fine CLAYEY SAND (SC) from 682.2 to 682.7. HARD DRILLING 662.7 TO 665.7. CORE RUN TIME = 45 minutes		DCS-137	100
665		-442	DCS-138	70
670		-447	DCS-138	100
675		-452	DCS-140	68
680		-457	DCS-141	30
	NO RECOVERY, barrel not locked in core pipe.			
685		-462	NR-142	0
	NO RECOVERY, loose sand fell through catcher. Driller trying different length sampler shoes to attempt to improve recovery.			
690		-467	NR-143	0
	SAND WITH SILT (SM) - gray, subrounded, fine to medium, wet, quartz, trace mica, CLAYEY SAND (SC) from 692.7 to 693.2, large lignite fragment at 693.7.			
695		-472	DCS-144	100
	NO RECOVERY, sampling shoe locked in casing and sheared off, drilling indicates probably coarse gravel-sized deposit, probable channel lag deposit.			
700		-477		

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21

ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
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MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)
700	NO RECOVERY, sampling shoe locked in casing and sheared off, drilling indicates probably coarse gravel-sized deposit, probable channel lag deposit.		-477
	NO RECOVERY, still in coarse sand and gravel based on rig chatter and examination of drill cuttings in mud.		
705			-482
	NO RECOVERY		
710			-487
	NO RECOVERY, gravel lag deposit.		
715			-492
	SILTY SAND (SM) - gray, subrounded to subangular, fine to medium, quartz, mica, thin laminae of dark gray clay, large lignite fragment at 717.7.		
	NO RECOVERY, tube locked in barrel and sheared off shoe.		
720			-497
	SAND WITH GRAVEL (SP) - tan-gray, subrounded to subangular, coarse to very coarse, some medium subrounded quartz gravel.		
725			-502
	SILTY SAND (SM) - gray, subrounded to subangular, fine to coarse, dense, moist, quartz, mica (muscovite), 4 inch seam of dark grayish black SANDY MICACEOUS SILT (ML), thin laminations of gray CLAY (CL) from 728 to 732, less CLAY and trace GRAVEL from 732 to 737.		
730			-507
735			-512
	SANDY SILT (ML) - gray, low plasticity, hard, moist, mixed with gray CLAYEY SAND (SC).		
740			-517
	SILTY SAND (SM) - gray, subrounded to subangular, fine to medium, wet, quartz, trace mica, seams of gray sandy silt ranging in thickness from 0.25 to 3.0 inches, some zones of CLAYEY SAND (SC) with green glauconitic staining at 752 feet, fining upward sequence (coarse to fine sand) from 777 to 772.		
745			-522
750			-527

SAMPLES

IDENT	TYPE	N-COUNT 1st 6" / 2nd 6" / 3rd 6" — RQD / % REC
NR-145	○	0
NR-146	○	0
NR-147	○	0
DCS-148	■	64
NR-149	○	0
DCS-150	■	9
DCS-151	■	50
DCS-152	■	50
DCS-153	■	46
DCS-154	■	6
DCS-155	■	40
DCS-156	■	–

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 15 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
750	SILTY SAND (SM) - gray, subrounded to subangular, fine to medium, wet, quartz, trace mica, seams of gray sandy silt ranging in thickness from 0.25 to 3.0 inches, some zones of CLAYEY SAND (SC) with green glauconitic staining at 752 feet, fining upward sequence (coarse to fine sand) from 777 to 772.	░	-527		▇	30
755		░	-532	DCS-157	▇	86
760		░	-537	DCS-158	▇	64
765		░	-542	DCS-159	▇	52
770		░	-547	DCS-160	▇	80
775		░	-552	DCS-161	▇	55
780		░	-557	DCS-162	▇	80
	SAND (SP) - tan, subrounded, fine to coarse, wet, quartz, trace mica, trace silt.	░		DCS-163	▇	77
785		░	-562			
	FAT CLAY WITH SAND (CH) - black-dark gray, medium to highly plastic, hard, quartz sand. OVERDRILLED TO 798 FEET.	▨		DCS-164	▇	30
790		▨	-567			
795		▨	-572			
		░			▇	
800			-577			

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

755 760 765 770 775 780 785 790 795

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL ELEVATION (ft) = 223.21 ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
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MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	RQD / % REC
800	TOP OF PIO NONO/UNNAMED (MIDDENDORF FORMATION) AT 798 FEET. SAND WITH SILT (SM) - tan-white, subrounded to subangular, fine to medium, wet, quartz, mica (muscovite), fining upward sequence (medium to coarse sand) from 808 to 803.	-577	DCS-165			50
805		-582	DCS-166			90
808	SAND WITH SILT (SM) - white-gray, subrounded to subangular, fine to coarse, wet, quartz, mica, some 1/2 to 1/4 inch subrounded quartz gravel, black Manganese staining and cemented pieces of quartz sand with pyrite from 828 to 838.					
810		-587	DCS-167			76
815		-592	DCS-168			96
820		-597	DCS-169			96
825		-602	DCS-170			30
830		-607	DCS-171			80
835		-612	DCS-172			44
838	SAND WITH SILT (SM) - gray-tan, subrounded to subangular, fine to medium, wet, quartz, mica, 3 inch seam of gray SANDY SILT (ML) at 843 feet, some fine to coarse hard CLAYEY SAND (SC) at 848.					
840		-617	DCS-173			40
845		-622	DCS-174			46
850		-627				

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21

ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 17 **OF** 27

MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

SAMPLES: IDENT, TYPE, N-COUNT (1st 6", 2nd 6", 3rd 6"), RQD / % REC

PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	IDENT	RQD	% REC
850	CLAYEY SAND (SC) - light gray, subrounded to subangular, fine to medium, dense, quartz, mica. HARD DRILLING 850 to 853 FEET	-627	DCS-175		75
855		-632	DCS-176		88
	TOP OF CAPE FEAR FORMATION AT 858 FEET CLAYEY SAND (SC) -gray to dark gray, subrounded to subangular, fine to coarse, dense, quartz, mica, weak cementation from 861 to 863, yellowish green and red oxidation staining beginning at 870 feet, some large quartz pebbles (~1/2 inch) from 873 to 878, arkosic sand (weathered feldspars and angular quartz gravels from 878 to 888), some seams of light gray fine SAND WITH SILT (SM) with feldspar from 883 to 888. HARD DRILLING 878 to 883 FEET				
860		-637	DCS-177		92
865		-642	DCS-178		88
870		-647	DCS-179		96
875		-652	DCS-180		98
880		-657	DCS-181		100
885		-662	DCS-182		94
	SILTY SAND (SM) - brick red-gray-greenish yellow, subrounded, fine to medium, wet to moist, quartz, mica, some feldspar.				
890		-667	DCS-183		84
	SANDY ELASTIC SILT (MH) - red-gray, low to medium plasticity, hard, moist to dry, some zones of highly plastic FAT CLAY (CH), seam of CLAYEY SAND (SC) from 902.5 to 903.				
895		-672	DCS-184		45
900		-677			

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

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ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 18 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6" RQD / % REC
900	SANDY ELASTIC SILT (MH) - red-gray, low to medium plasticity, hard, moist to dry, some zones of highly plastic FAT CLAY (CH), seam of CLAYEY SAND (SC) from 902.5 to 903.	-677	DCS-185	100
	CLAYEY SAND (SC) - red-gray-yellow, subrounded, fine to medium, trace coarse sand at 908, quartz, feldspar, moist, some light green zones from 913 to 918.			
905		-682	DCS-186	88
910		-687	DCS-187	90
915		-692	DCS-188	94
	SANDY SILT (ML) - gray-red-green, low plasticity, very hard, dry, quartz, mica, trace feldspars, zone of SILTY SAND (SM) from 920 to 920.5, moderate to weak cementation, some zones strongly cemented/silicified from 923 to 928, oxidized root traces from 923 to 928, 3 inch seam of dark greenish gray ELASTIC SILT (MH) at 934. HARD DRILLING 918 to 934. CORE RUN TIMES = 20 minutes HARD DRILLING 934 to 938. CORE RUN TIME = 45 minutes HARD DRILLING 938 to 938.5. CORE RUN TIME = 15 minutes			
920		-697	DCS-189	98
925		-702	DCS-190	90
			DCS-191	100
930		-707		
			DCS-192	100
935		-712		
			DCS-193	5
			DCS-194	20
940		-717	DCS-195	4
945	CLAYEY SAND (SC) - dark-gray, subrounded, fine, very dense, dry, quartz, trace mica.	-722	DCS-196	100
	SANDY SILT (ML) - light gray, low plasticity, very hard, fine sand, 1 inch intraclast of red weathered siltstone. HARD DRILLING 948 to 948.5. CORE RUN TIME = 45 minutes		DCS-197	50
950		-727		

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

0 10 20 30 40 50 60 70 80 90 100

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

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SOIL TEST BORING RECORD

BORING NO.: B-1003
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LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
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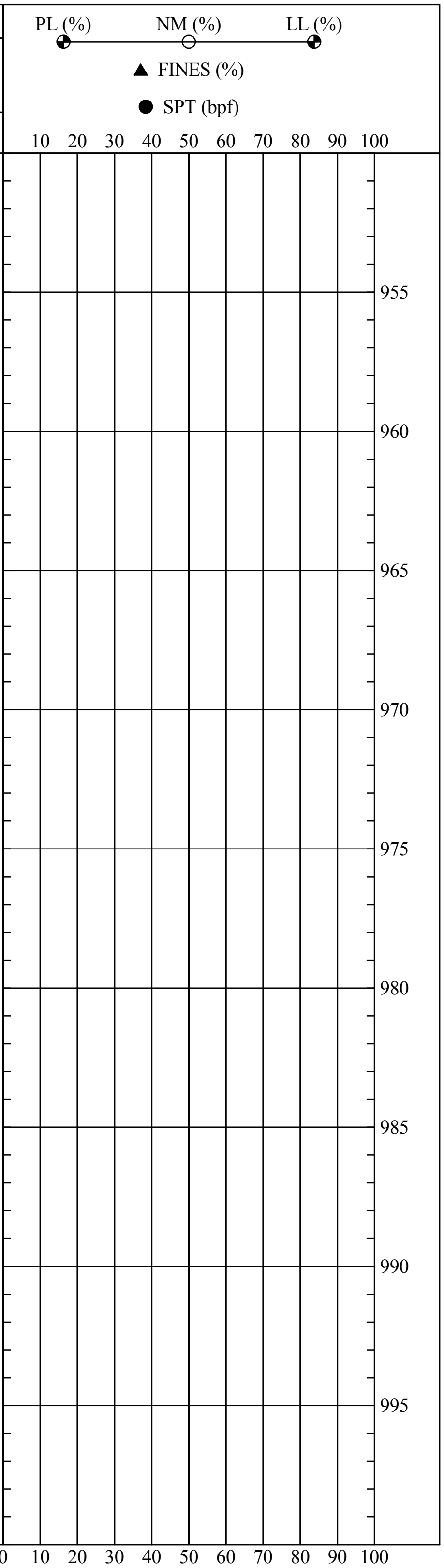
MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" RQD % REC
950			-727	DCS-198		9
	CLAYEY SAND (SC) - red-green, subrounded to subangular, medium to coarse, dry, quartz, weathered feldspar, trace mica.					
	SANDY SILT (ML) - gray-red-green, low plasticity, dry, fine sand, oxidized root traces.					
955			-732	DCS-199		96
				DCS-200		100
960	SILTY SAND (SM) - gray, fine, dense, dry, weak to moderate cementation.		-737			
	SILTY SAND (SM) - gray, subrounded to subangular, fine to coarse, dry to wet, quartz, fining upward sequence (coarse sand at bottom of run).					
				DCS-201		98
965	Same as above, greenish gray, grades into CLAYEY SAND (SC) at bottom of run, abundant muscovite		-742			
				DCS-202		50
970	Same as above.		-747			
				DCS-203		88
975	Same as above, medium to coarse, rounded sand grains, some rounded quartz gravels (~1/2 inch), subangular feldspar gravels.		-752			
				DCS-204		83
	Same as above, seam of greenish gray SANDY SILT (ML) 980 to 981.5.					
980			-757			
				DCS-205		100
	Same as above, red oxidation patches.					
985			-762			
				DCS-206		86
	Same as above, some large angular to subrounded quartz pebbles (~1 inch).					
990			-767			
				DCS-207		86
	Same as above, forest green color.					
995			-772			
				DCS-208		100
	Same as above.					
1000			-777			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
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SOIL TEST BORING RECORD

BORING NO.: B-1003
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LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 20 **OF** 27

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
1000	Same as above.	-777	DCS-209		80
1005	Same as above, fine at bottom of run.	-782	DCS-210		86
1010	Same as above, fine to coarse, 6 inch seam of dark brown CLAYEY SAND (SC), containing some lignite from 1010 to 1010.5 feet.	-787	DCS-211		76
1015	Same as above, some coarse sand and 1/4 inch subrounded quartz pebbles at bottom of run.	-792	DCS-212		76
1020	Same as above, some coarse subrounded quartz and feldspar grains.	-797	DCS-213		60
1025	Same as above, seam of grayish black SANDY SILT (ML) from 1025 to 1026.	-802	DCS-214		98
1030	Same as above, with GRAVEL, seam of coarse subrounded quartz gravel 1030 to 1031, gravels are 1 to 2 inches in diameter.	-807	DCS-215		50
1035	Same as above, zones of dark brown SANDY SILT (ML).	-812	DCS-216		54
1040	Same as above, 2 inch subrounded quartz cobble at bottom of run.	-817	DCS-216		80
1045	GRAVEL (GP) - subrounded to angular, very coarse, quartz.	-822	DCS-218		20
	SANDY SILT (ML) - green, low plasticity, hard, moist to dry, fine sand.				
1050		-827			

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7974.36, E 7889.85
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21
ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 21 **OF** 27

MACTEC

DEPTH (ft)	ELEV (ft)
1050	-827
1055	-832
1060	-837
1065	-842
1070	-847
1075	-852
1080	-857
1085	-862
1090	-867
1095	-872
1100	-877

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

TOP OF TRIASSIC BASIN AT 1048.9 SANDY SILT (ML) - red, low plasticity, hard, dry, fine sand, mica.

SANDY SILT (ML) - red, low plasticity, hard, dry, fine sand, mica, 3 inch cobble of moderately hard gray and black fractured BIOTITE GNEISS at 1054.

Same as above, medium to coarse SAND, likely weathered CONGLOMERATE, 1 inch clasts of weathered feldspar and BIOTITE GNEISS. SOIL CORING BIT REFUSAL AT 1057 FEET. SWITCHED TO DIAMOND ROCK CORE BIT AT 1057 FEET.

Same as above, angular clasts of quartz, feldspar, and BIOTITE GNEISS.

WEATHERED MUDSTONE which sampled as SANDY SILT (ML) - red, hard, non-plastic, dry, clasts of BIOTITE GNEISS with reddish oxidation.

WEATHERED CONGLOMERATE which sampled as GRAVEL WITH SILT AND SAND (GM) -red, medium to coarse gravel, fine to coarse sand, gravel consists of green highly weathered chloritic PHYLLITE, pink and white GRANITIC GNEISS, white and black BIOTITE GNEISS, quartz, some MUDSTONE AND SANDSTONE clasts, slickensided surface noted at 1066 feet, matrix consists of red SILT.

Same as above, clasts of BIOTITE GNEISS DRILLER NOTED HARDER ROCK AT 1070 CORING RATE FROM 1070 TO 1074 = 12 minutes per foot.

MUDSTONE - red, fine grained, medium hard, trace sand. ENDED DRILLING ON 9/28/05 GEOPHYSICAL LOGGING PERFORMED BY GEOVISION ON 10/3/05 AND 10/4/05. LOGGING INCLUDED P-S SEISMIC SUSPENSION, NATURAL GAMMA, ELECTRICAL RESISTIVITY, CALIPER, AND DIRECTIONAL SURVEY. REAMED HOLE WITH 19 INCH ROLLER CONE BIT 10/4/05 THROUGH 10/5/05 TO 93 FEET. SET AND GROUTED IN 14 INCH I.D. STEEL CASING ON 10/7/05. REAMED HOLE WITH 12.25 INCH ROLLER CONE BIT 10/10/05 THROUGH 10/21/05. SET AND GROUTED IN 6.5 INCH I.D. STEEL CASING ON 10/24/05.

Same as above, red, soft to moderately hard, trace rounded quartz grains and mica (muscovite).

BRECCIA - red, highly weathered, soft, clasts range up to 2" in diameter and consist of subrounded to angular quartz, granitic gneiss, biotite gneiss, red mud matrix.

MUDSTONE - red, medium to moderately hard, trace rounded quartz grains, trace mica.

BRECCIA - red-gray, weathered, soft to medium hard, clasts are 1/4 to 1" in diameter and generally consist of quartz, feldspar, biotite gneiss, and some greenish phyllite, bottom 1.5 feet is mostly clast supported, red mud matrix where present.

SANDSTONE - red, arkosic, soft to medium hard, fine to coarse from 1088 to 1092, contains quartz, feldspar, trace mica, grades into clast supported breccia at 1090.2.

BRECCIA - red and gray, medium hard to soft, coarse, clasts of gray and white biotite gneiss, quartz, and greenish phyllite.

SANDSTONE - red, medium to moderately hard, highly weathered at bottom of run.

BRECCIA - red, soft to medium hard, matrix supported, slightly conglomeratic, 1/4" to 1/2" clasts of quartz, feldspar, gneiss, and phyllite.

MUDSTONE - red, moderately hard, sandy zone at 1096.5 with angular quartz and feldspar grains, thin vein of gypsum or calcite at 1097.

SAMPLES

IDENT	RQD	% REC
DCS-219		100
DCS-220		100
RC-1		50
RC-2		20
RC-3		92
RC-4	24	58
RC-5	40	75
RC-6	0	10
RC-7	70	76
RC-8	84	100
RC-9	40	72

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7974.36, E 7889.85 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 223.21

ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 22 **OF** 27

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

PL (%) NM (%) LL (%)
▲ FINES (%)
● SPT (bpf)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD / % REC
1100	BRECCIA - moderately to medium hard, matrix supported, large angular clasts of quartz and gneiss, sandy mud matrix.	△ △	-877	RC-10		10 / 15
				RC-11		30 / 30
1105			-882			
				RC-12		30 / 44
	MUDSTONE - red, moderately hard, trace quartz sand.					
1110			-887			
				RC-13		70 / 95
	BRECCIA - highly weathered, soft, clasts of gneiss and quartz, matrix supported.	△ △				
1115			-892			
				RC-14		33 / 66
	SANDSTONE - red, arkosic, moderately hard, quartz, feldspar, trace mica, mud matrix.	⁚⁚⁚				
1120			-897			
	BRECCIA - red, highly weathered, soft to moderately hard, clast supported, matrix mostly sand sized, some mud matrix between sand grains, quartz, feldspar, phyllite, biotite gneiss, granitic gneiss, severely weathered zones at 1125 and 1128, grades into coarse sandstone at 1125 and 1127.	△ △		RC-15		46 / 100
1125			-902			
				RC-16		68 / 98
1130			-907			
				RC-17		0 / 5
	NO RECOVERY					
1135			-912			
				RC-18		0 / 0
	NO RECOVERY					
1140			-917			
				RC-19		0 / 0
	SANDSTONE - red and light green, medium hard, fine to medium grained, steeply dipping joints at 1145 and 1146 (approx. 60 degree dip), joints are filled with calcite or gypsum mineralization, joint at 1145 is offset approx. 1/2" by a cross-cutting horizontal joint, occasional angular clasts of quartz and biotite gneiss 1/2" to 1 1/2 " diameter from 1147 to 1151, highly weathered zone from 1148 to 1150 which sampled as red SILTY SAND (SM).	⁚⁚⁚				
1145			-922	RC-20		63 / 100
				RC-21		52
1150			-927			

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
HOLE DIA.:	6 inches
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	ELEVATION (ft) = 223.21
	ELEVATION DATUM = NAVD 88

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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 23 **OF** 27

MACTEC

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf)

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD / % REC
1150		-927		100
	BRECCIA - red, moderately hard, clast supported, clasts of quartz, gneiss, some mud matrix.			
	SANDSTONE - red, fine grained, soft to hard (bottom 1 foot), quartz, trace mica, borderline mudstone, weathered zone 1153.5 to 1154.5, relict root trace pattern at bottom of run, 45 degree dipping joint at 1152.5, horizontal joints at 1155 and 1155.5.		RC-22	65 / 100
1155		-932		
	BRECCIA - red-gray-pink, clast supported, soft to moderately hard, clasts of quartz, chloritic phyllite, gneiss and pink granitic gneiss, weathered, some mud matrix, zones of matrix supported breccia and conglomerate from 1164 to 1169.		RC-23	42 / 100
1160		-937		
			RC-24	0 / 28
1165		-942		
			RC-25	44 / 100
1170	SANDSTONE - red, fine to medium grained, moderately hard, quartz, trace mica, mud matrix.	-947		
	BRECCIA - red, moderately hard to soft, clast supported, 1/2 to 2" clasts of quartz, biotite gneiss, feldspar, chloritic phyllite, some mud matrix.		RC-26	36 / 98
1175		-952		
	SANDSTONE - red, fine grained, hard, quartz, trace mica, some greenish reduction splotches.		RC-27	48 / 94
	Same as above, moderately hard to hard, sone zones are highly weathered soft rock which sampled as SILTY SAND (SM).			
1180		-957		
			RC-28	45 / 100
	Same as above.		RC-29	0 / 50
1185	SANDSTONE - red, hard, fine to medium grained, quartz, trace mica, trace feldspar, green reduction splotches, top 6 inches weathered (soft to moderately hard).	-962		
			RC-30	74 / 86
1190	Same as above, weathered joints at 1191 and 1193.5, other breaks in core are machine breaks, coarser (breccia) zones at joints with larger angular clasts of quartz and gneiss.	-967		
			RC-31	82 / 86
1195	MUDSTONE - red, hard, grades into sandstone at 1196.7	-972		
	SANDSTONE - red, hard, quartz, feldspar, mica, muddy matrix, joints at 1196.7, 1197.3, 1197.7, 1198, 1198.4, 1198.75, 1199.1, 1199.4, 1199.8, joint at 1199.8 slightly weathered, zones of breccia at 1197 to 1197.6, 1198.7 to		RC-32	98 / 100
1200		-977		

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT:	Speedstar Quickdrill 275/Gardner Denver 15W
METHOD:	Christensen Wire Line
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 24 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	RQD % REC
1200	1199, and 1199.3 to 1199.75. Same as above, zone of breccia 1201.5 to 1202.3, joints at 1201.7, 1202, 1202.3.	-977	RC-33		86/100
1205	Same as above, moderately hard.	-982			
	BRECCIA - soft to moderately hard, highly weathered		RC-34		30/94
1210		-987	RC-35		30/100
1215		-992			
	SANDSTONE - red, hard, quartz, mica, feldspar, steeply dipping joint (approx. 65 degrees) at 1211.5, surface of joint slickensided.		RC-36		70/100
	BRECCIA - highly weathered, soft to moderately hard (1220 to 1225), becomes hard and matrix supported from 1225 to 1230, angular clasts of quartz, gneiss, phyllite, mud and sandstone matrix.				
1220		-997	RC-37		25/100
1225		-1002	RC-38		58/66
1230	SANDSTONE - red moderately hard to hard, weathered joint at 1230.5 and 1232, occassional clasts of angular quartz (approx. 1" in size), badly weathered from 1233 to 1234.	-1007	RC-39		115/125
	SANDSTONE - red, moderately hard to hard, zones of breccia at 1234.5, 1235, 1236 to 1237, and 1237 to 1239, breccia is mostly matrix supported.				
1235		-1012	RC-40		92/100
	BRECCIA - moderately hard to hard, some zones of sandstone, steeply dipping (approx. 70 degrees) slickensided joint at 1241.5, slickensides appear as near horizontal grooves.				
1240		-1017	RC-41		86/86
	SANDSTONE - reddish brown, moderately hard to hard, top 6" badly weathered, bottom 3" weathered, zones of matrix supported breccia at 1246 and 1247.5.				
1245		-1022	RC-42		73/98
	BRECCIA - red, moderately hard to hard, matrix supported, sandy mud matrix, clasts of angular quartz, feldspar, phyllite, gneiss, and quartz monzonite, bottom 12" slightly weathered				
1250		-1027			

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

0 10 20 30 40 50 60 70 80 90 100

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 25 **OF** 27

MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

SAMPLES — N-COUNT: 1st 6" 2nd 6" 3rd 6" / RQD / % REC

PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	IDENT	RQD / % REC
1250	BRECCIA - red, moderately hard to hard, matrix supported, sandy mud matrix, clasts of angular quartz, feldspar, phyllite, gneiss, and quartz monzonite, bottom 12" slightly weathered.	-1027	RC-43	78 / 100
	Same as above.			
1255		-1032	RC-44	90 / 100
	Same as above, bottom 1' weathered.		RC-45	40 / 100
1260	Same as above, medium to moderately hard, clast supported breccia from 1260 to 1263, some weathered zones at top of run.	-1037	RC-46	74 / 100
1265	Same as above, moderately hard, slightly weathered.	-1042		
	MUDDY SANDSTONE - red, fine to medium grained, moderately hard to hard, 45 degree dipping slickensided joint at 1266.5, greenish reduction staining on joint surface, 60 degree dipping joint at 1268 with reduction staining.		RC-47	85 / 100
	BRECCIA - red, matrix supported, hard to moderately hard, vug with some calcite mineralization at 1269.			
1270	Same as above, with some sandstone, 30 degree dipping slickensided joint at 1270.5.	-1047		
	SANDSTONE - red, medium to moderately hard, fine to medium grained, quartz, feldspar, 2 60 degree dipping joints at 1272.5.		RC-48	68 / 96
	BRECCIA - matrix supported, moderately hard, clasts of quartz, gneiss, and some hornblende gneiss with light green alteration.			
1275		-1052		
	Same as above, some zones of clast supported breccia, moderately weathered, highly fractured and weathered clast of gneiss approximately 6 inches at top of run.		RC-49	56 / 100
1280	Same as above, red and gray, clasts of biotite gneiss, phyllite, and pinkish granitic gneiss.	-1057	RC-50	8 / 100
1285	Same as above, medium to moderately hard, 45 degree dipping slickensided joint at 1285.5.	-1062		
	SANDY MUDSTONE - hard, red, breccia zone at 1288, trace quartz, mica, and feldspar, 45 degree dipping slickensided joint at 1288.5		RC-51	65 / 92
1290		-1067		
	BRECCIA - hard, matrix supported, very steeply dipping quartz filled joints throughout.		RC-52	100 / 100
1295	Same as above, zone of sandstone from 1298.5 to 1299.5, 45 degree dipping joint at 1295.5.	-1072	RC-53	65 / 92
1300		-1077		

0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	GRAVES DRILLING (STEVE RODGERS)
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METHOD:	Christensen Wire Line
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 26 **OF** 27

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)
1300	Same as above, clast supported, very large clast of pink granitic gneiss at top of run.	-1077
	Same as above, matrix supported, red, moderately hard to hard, zones of sandstone, clasts of quartz, gneiss, and phyllite, 60 degree dipping joint with reduction staining at 1305.5.	
1305		-1082
	Same as above, hard.	
1310		-1087
	Same as above, sandstone from 1313.5 to 1316, hard.	
1315		-1092
	SANDSTONE - red, hard, zone of breccia at 1317, greenish reduction splotches at 1319 to 1320, 45 degree dipping joint at 1318, zone of breccia with quartz clasts from 1322 to 1324.	
1320		-1097
1325	BRECCIA - red, matrix supported, hard, red mud matrix, angular clasts of quartz, granitic gneiss, and phyllite.	-1102
	Same as above, hard, some zones fractured.	
1330		-1107
	SANDSTONE - red, fine to medium, hard, trace mica, quartz and feldspar.	
1335	BRECCIA - red, clast supported, hard, clasts of quartz, granitic gneiss, and phyllite.	-1112
	Same as above, hard.	
	CORING TERMINATED AT 1338 FEET 11/9/2005 GEOPHYSICAL LOGGING PERFORMED BY GEOVISION ON 11/10/05 and 11/11/05. LOGGING PERFORMED FROM 1054 feet to 1338 feet. LOGGING INCLUDED P-S SEISMIC SUSPENSION, NATURAL GAMMA, ELECTRICAL RESISTIVITY, and CALIPER. STEEL CAP WELDED IN PLACE ON 6" CASING STICKUP.	
1340		-1117
1345		-1122
1350		-1127

SAMPLES

IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6" / RQD % REC
RC-54		56/106
RC-55		100/100
RC-56		57/97
RC-57		88/113
RC-58		100/100
RC-59		100/100
RC-60		45/45
RC-61		70/100
RC-62		93/100
RC-63		100/100

PL (%) NM (%) LL (%)

▲ FINES (%)

● SPT (bpf)

10 20 30 40 50 60 70 80 90 100

1305 1310 1315 1320 1325 1330 1335 1340 1345

0 10 20 30 40 50 60 70 80 90 100

DRILLER: GRAVES DRILLING (STEVE RODGERS)
EQUIPMENT: Speedstar Quickdrill 275/Gardner Denver 15W
METHOD: Christensen Wire Line
HOLE DIA.: 6 inches
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SOIL TEST BORING RECORD

BORING NO.: B-1003
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 27 **OF** 27

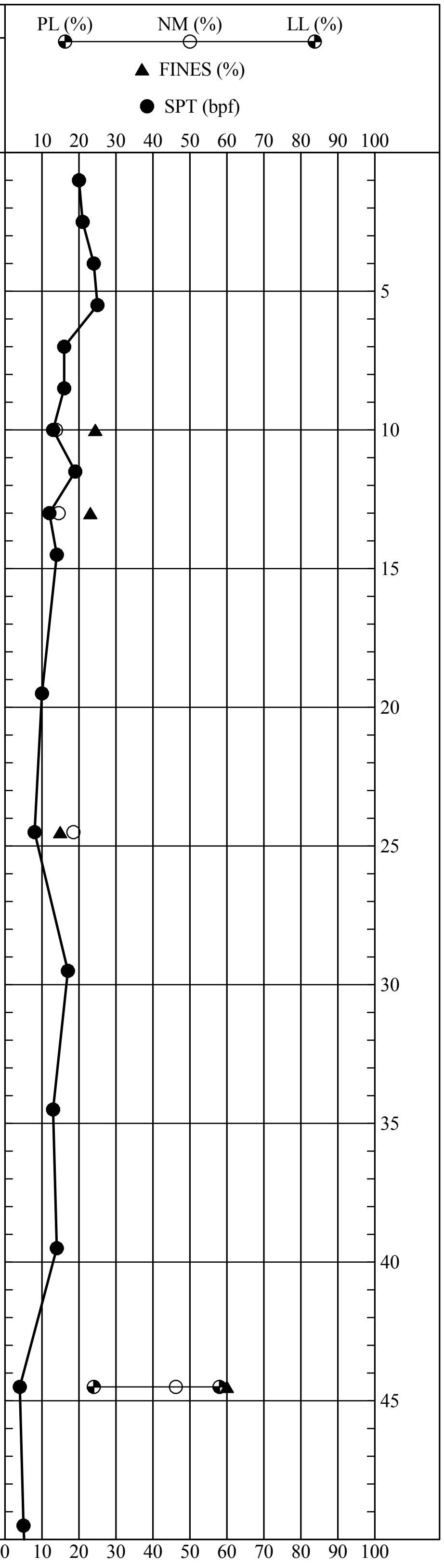
MACTEC

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)
0	SAND (SP); red and brown, subangular, medium dense, fine to medium grained, dry (FILL)	250
	SAND (SP); tan to red, subangular, medium dense, fine to medium grained, dry	
	Same as above, mottled with gray CLAYEY SILT	
5	SAND (SP); red and brown, subangular, medium dense, fine to medium grained, moist	245
10	SILTY SAND (SM); tan, subangular, medium dense, fine sand, homogeneous	240
	Same as above, mottled with red and gray sandy soils	
15		235
20	SAND (SP); brown, subangular, medium dense, fine to medium grained, dry	230
25	SILTY SAND (SM); brown, loose	225
30	Same as above, tan, brown, medium dense, striated	220
35	SAND WITH SILT (SP-SM); brown, subangular, medium dense, fine to coarse sand, wet	215
40	SAND (SP); brown, subangular, medium dense, fine to medium grained sand, mottled with tan CLAYEY SILT, moist	210
45	SANDY CLAY (CL); tan, low to medium plasticity, soft, fissured with thin layers of fine to medium grained sand	205
50	CLAYEY SILTY SAND (SM-SC); gray-brown, loose, fine to coarse grained sand	200

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT-1	☒	2-9-11 (N = 20)
SPT-2	☒	11-11-10 (N = 21)
SPT-3	☒	5-10-14 (N = 24)
SPT-4	☒	17-13-12 (N = 25)
SPT-5	☒	10-8-8 (N = 16)
SPT-6	☒	8-8-8 (N = 16)
SPT-7	☒	8-5-8 (N = 13)
SPT-8	☒	8-9-10 (N = 19)
SPT-9	☒	9-6-6 (N = 12)
SPT-10	☒	4-6-8 (N = 14)
SPT-11	☒	6-5-5 (N = 10)
SPT-12	☒	4-3-5 (N = 8)
SPT-13	☒	5-7-10 (N = 17)
SPT-14	☒	8-8-5 (N = 13)
SPT-15	☒	7-7-7 (N = 14)
SPT-16	☒	1-2-2 (N = 4)
SPT-17	☒	4-2-3



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 249.78

ELEVATION DATUM = NAVD 88

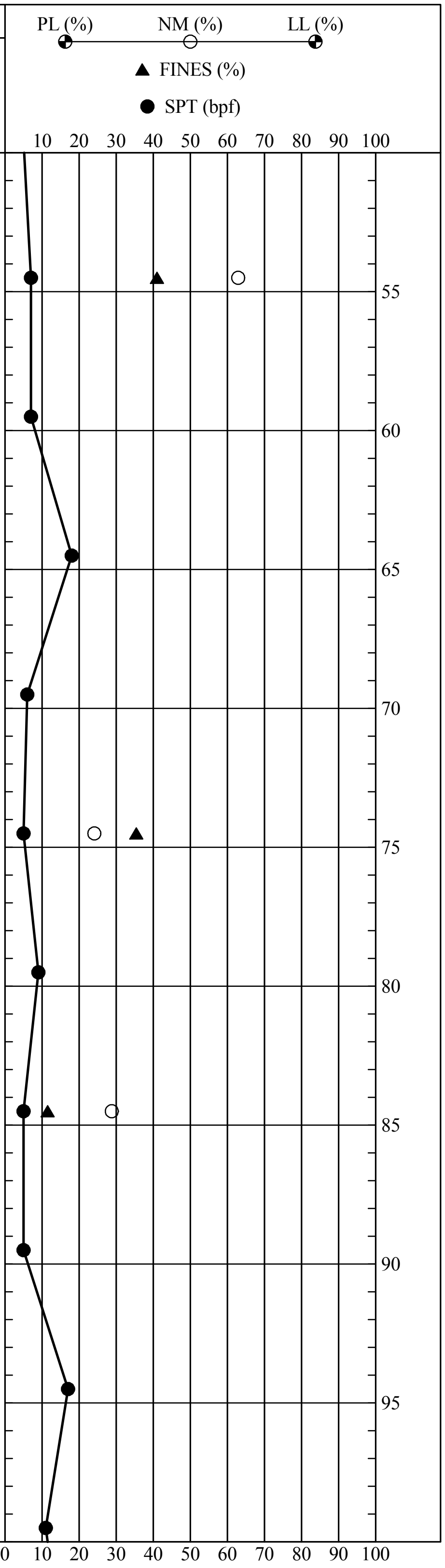
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 7

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	CLAYEY SILTY SAND (SM-SC); gray-brown, loose, fine to coarse grained sand	200			(N = 5)
	SILTY SAND (SM); gray, loose, very fine sand, dry, homogeneous				
55		195	SPT-18	☒	2-3-4 (N = 7)
60		190	SPT-19	☒	2-3-4 (N = 7)
	Lost circulation at 65' SILTY CLAYEY SAND (SC-SM); white, gray, medium dense, with medium to coarse grained quartz fragments and shells, moist, +HCL				
65		185	SPT-20	☒	6-11-7 (N = 18)
	SILTY SAND (SM); gray, loose, fine to medium sand, <5% shells, moist to wet, +HCL				
70		180	SPT-21	☒	3-3-3 (N = 6)
	Same as above, shell fragment layers				
75		175	SPT-22	☒	4-3-2 (N = 5)
	CLAYEY SILTY SAND (SM-SC); grey, very loose, <5% shells, fine to medium grained sand, <5% shell fragments				
80		170	SPT-23	☒	0-4-5 (N = 9)
	SILTY SAND (SM); gray, gap graded, loose, fine grained sand, <20% quartz fragments				
85		165	SPT-24	☒	2-2-3 (N = 5)
90		160	SPT-25	☒	2-3-2 (N = 5)
	Same as above, medium dense				
95		155	SPT-26	☒	8-10-7 (N = 17)
100		150	SPT-27	☒	4-5-6



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 249.78

ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 7

MACTEC

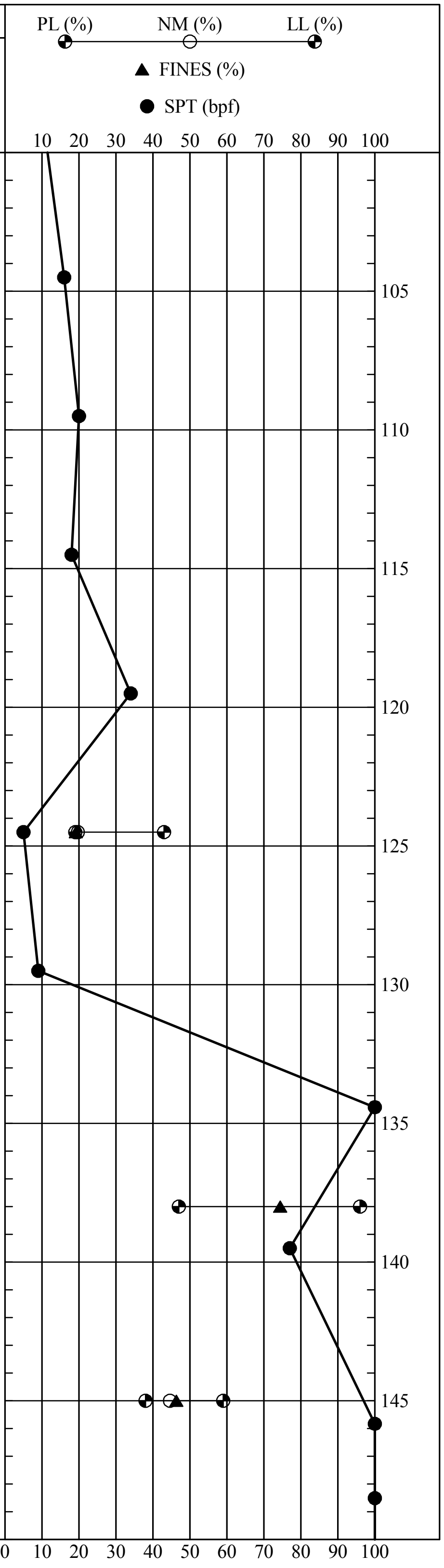
SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)
100	Same as above, medium dense	150
105	SAND (SP); gray, subangular, medium dense, fine to medium grained sand, homogeneous, wet, -HCL	145
110		140
115		135
120	SAND WITH SILT (SP-SM); gray, dense with CLAY bands	130
125	Top of Utley Limestone Formation at 123.5' CLAYEY SAND (SC); green to white, low to medium plasticity, loose, cemented shells and some shell fragments, 30% fines, +HCL	125
130	SILT (ML); brown to white, >80% cemented shell fragments, wet, +HCL	120
135	CLAYEY SILT (ML/CL); brown, medium plasticity, very hard, homogeneous, +HCL Top of Lisbon Formation (Blue Bluff Marl) at 134.0' ELASTIC SILT WITH SAND (MH); green, non plastic, hard, flaky, trace mica, some fine sand, cemented layers/nodules Pocket Penetrometer = >4.5 tsf, >4.5 tsf, >4.5 tsf	115
140		110
145		105
150	FOSSILIFEROUS LIMESTONE; recovered mostly broken pieces of impure fossiliferous gray limestone (Marl), consisting of quartz sand, shell fragments, and some phosphatic material cemented in a carbonate matrix, some zones of SILTY SAND (SM)	100

SAMPLES

IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")
	(N = 11)
SPT-28	6-6-10 (N = 16)
SPT-29	10-10-10 (N = 20)
SPT-30	6-8-10 (N = 18)
SPT-31	9-14-20 (N = 34)
SPT-32	9-4-1 (N = 5)
SPT-33	14-4-5 (N = 9)
SPT-34	20-50/5"
SPT-35	11-33-44 (N = 77)
UD-1	
SPT-36	50/4"
SPT-37	50/0"



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

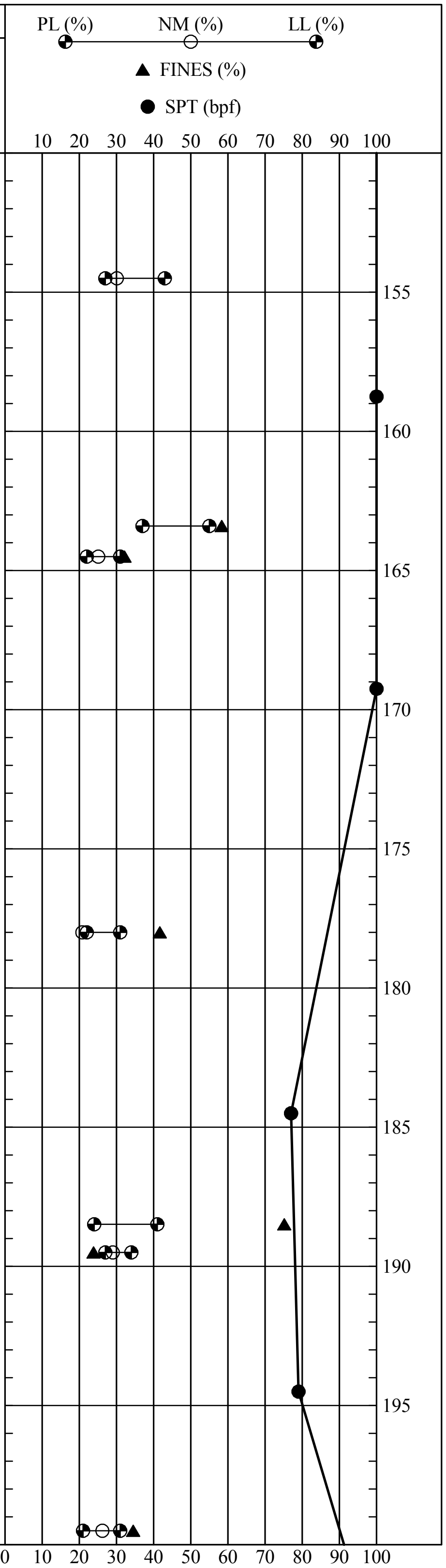
DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05 ELEVATION (ft) = 249.78 ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 7

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6"
150	FOSSILIFEROUS LIMESTONE; recovered mostly broken pieces of impure fossiliferous gray limestone (Marl), consisting of quartz sand, shell fragments, and some phosphatic material cemented in a carbonate matrix, some zones of SILTY SAND (SM)	100		
			UD-2	
155		95		
			SPT-38	50/3"
160		90		
	ELASTIC SILT (MH); green, low plasticity, hard, 15-20% fine quartz fine sand, cemented layers and shell hash, dry, +HCL Pocket Penetrometer = 3.5 tsf, >4.5 tsf and 4.5 tsf			
165		85	UD-3	
			SPT-39	33-50/3"
170		80		
	No Recovery			
175		75		
	SILTY SAND (SM); green, moist, cemented layers, +HCL Pocket Penetrometer = >4.5 tsf		UD-4	
180		70		
	SILTY SAND (SM); green, very dense, homogeneous, very fine sand, some quartz, cemented layers, some sand-sized cemented carbonate observed with 20X hand lens		SPT-40	22-36-41 (N = 77)
185		65		
	LEAN CLAY WITH SAND (CL) - light gray			
	SILTY SAND (SM); green, very dense, homogeneous, very fine sand, some quartz, cemented layers, some sand-sized cemented carbonate observed with 20X hand lens		UD-5	
190		60		
			SPT-41	24-36-43 (N = 79)
195		55		
	CLAYEY SAND (SC); green, very dense, very fine sand, dry, +HCL		UD-6	
200		50		



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 249.78

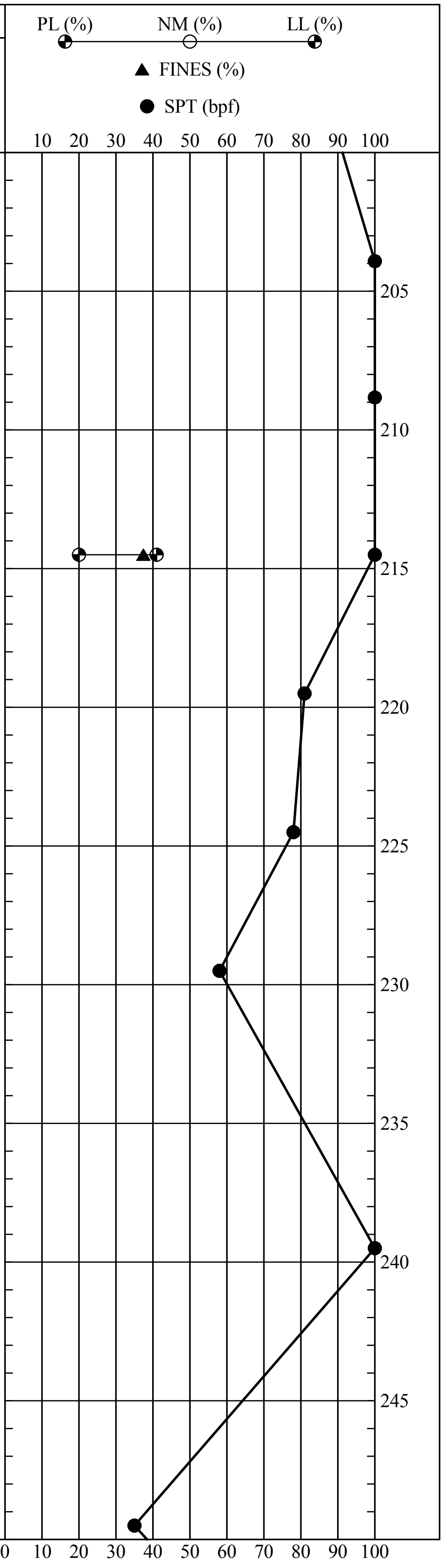
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 4 **OF** 7

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	SAMPLES N-COUNT (1st 6" 2nd 6" 3rd 6")
200	CLAYEY SAND (SC); green, very dense, very fine sand, dry, +HCL	50		
	FOSSILIFEROUS LIMESTONE; recovered mostly limestone fragments consisting of sand and shells in a carbonate matrix		SPT-42	50/5"
205		45		
	SILT (ML); green, non plastic, hard, >20% weathered shells, dry, +HCL		SPT-43	50/4"
210	Pocket Penetrometer = 2.0 tsf and 3.5 tsf	40		
	CLAYEY SAND (SC); green, very dense, <5% shells, dry, +HCL		SPT-44	13-20-50/4"
215	Pocket Penetrometer = 3.0 tsf and 3.5 tsf	35		
	Pocket Penetrometer = 3.5 tsf and >4.5 tsf		SPT-45	13-36-45 (N = 81)
220		30		
	SAND (SP); green, gray, very dense, cemented shell and limestone fragments, trace of CLAY and SILT, wet, +HCL		SPT-46	24-29-49 (N = 78)
225		25		
	Same as above, some weathered shells		SPT-47	22-26-32 (N = 58)
230	Pocket Penetrometer = 2.5 tsf, 2.5 tsf and 2.0 tsf Top of Still Branch Formation at 229' WELL GRADED SAND (SW); dark green, well graded, very dense, fine grained, homogeneous, weathered shells, moist, +HCL	20		
235		15		
	SILTY SAND (SM); dark green, very dense, micaceous, dry, -HCL, with fine SAND		SPT-48	22-29-50/4"
240		10		
245		5		
	CLAYEY SAND (SC); green, black, gap graded, dense, moist, -HCL		SPT-49	12-18-17
250		0		



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05

ELEVATION (ft) = 249.78

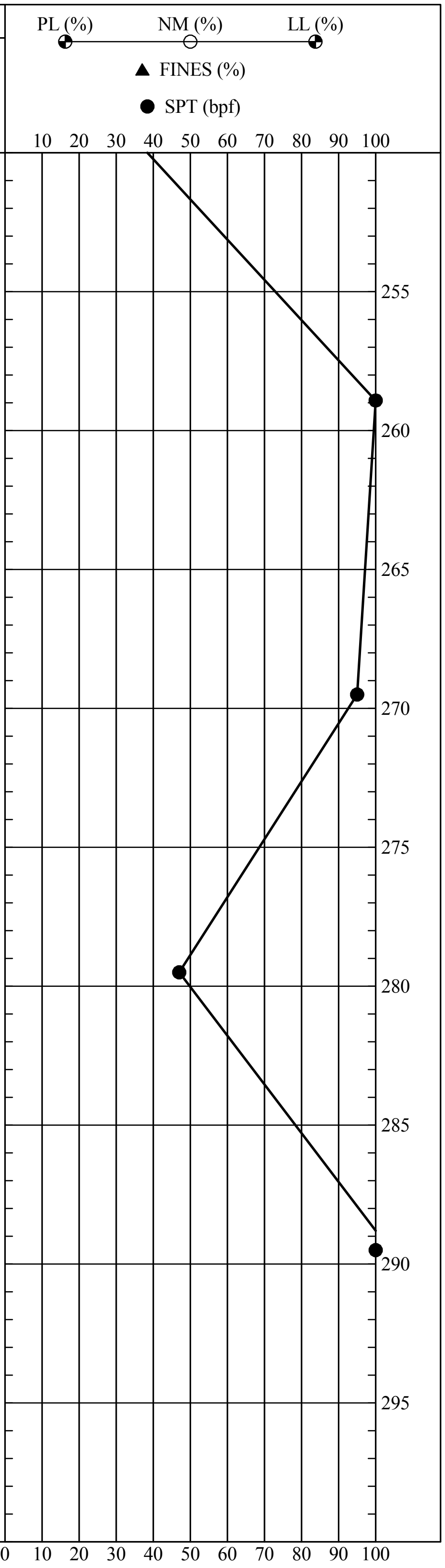
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 5 **OF** 7

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"
250	SANDY SILT (ML); dark green, trace CLAY, low plasticity, very stiff, fissured, dry, -HCL	0			(N = 35)
255		-5			
	Same as above, with fine to medium QUARTZ grains		SPT-50	☒	50/5"
260		-10			
265		-15			
	SAND (SP); dark green, trace CLAY, gap graded, very dense, fine to medium sand, moist , -HCL				
270		-20	SPT-51	☒	35-48-47 (N = 95)
275		-25			
	Top of Congaree Formation at 278'				
280	CLAYEY SILT (ML/CL); red, low plasticity, hard, mottled with gray and tan SILT, dry, -HCL	-30	SPT-52	☒	14-20-27 (N = 47)
285		-35			
	CLAYEY SANDY SILT (ML); brown, tan, gray, low plasticity, very dense, some mica, dry				
290	Hole drilled out to 304' with a 3 7/8" roller cone bit for geophysical logging	-40	SPT-53	☒	27-49-55 (N = 104)
295		-45			
300		-50			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05 ELEVATION (ft) = 249.78 ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 6 **OF** 7

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6"	N-COUNT 2nd 6"	N-COUNT 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
300	Hole drilled out to 304' with a 3 7/8" roller cone bit for geophysical logging		-50						
	Boring terminated at 304 feet on 10/4/05								
305			-55						305
310			-60						310
315			-65						315
320			-70						320
325			-75						325
330			-80						330
335			-85						335
340			-90						340
345			-95						345
350			-100						0 10 20 30 40 50 60 70 80 90 100

SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7985.41, E 6131.44 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/15/05
	ELEVATION (ft) = 249.78
	ELEVATION DATUM = NAVD 88

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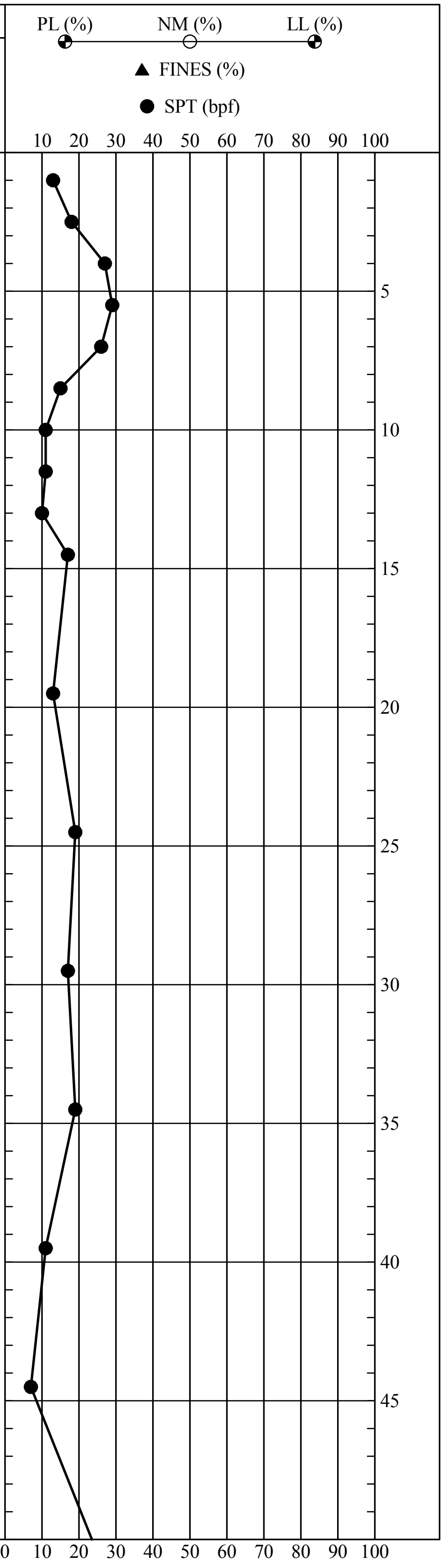
SOIL TEST BORING RECORD

BORING NO.: B-1004
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 14, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 7 **OF** 7

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	SAND (SP); red, medium dense, homogeneous with rock fragments, medium grained (FILL)	253	SPT-1	☒	4-7-6 (N = 13)
	SAND (SP); red and brown, medium dense, mottled, fine to medium grained (FILL)		SPT-2	☒	4-9-9 (N = 18)
	Barnwell Formation at 2.5' SAND (SP); red and brown, medium dense, mottled, fine to medium grained, moist		SPT-3	☒	6-12-15 (N = 27)
5		248	SPT-4	☒	11-12-17 (N = 29)
	Same as above, contains fine grained sand		SPT-5	☒	12-13-13 (N = 26)
			SPT-6	☒	8-8-7 (N = 15)
10		243	SPT-7	☒	7-6-5 (N = 11)
			SPT-8	☒	5-6-5 (N = 11)
	Same as above, tan, brown, pink and striated		SPT-9	☒	6-5-5 (N = 10)
	Same as above, mottled		SPT-10	☒	5-8-9 (N = 17)
15		238			
			SPT-11	☒	4-6-7 (N = 13)
20		233			
			SPT-12	☒	5-9-10 (N = 19)
25		228			
	Same as above, pink and tan		SPT-13	☒	7-8-9 (N = 17)
30		223			
	Same as above, pink and tan, homogeneous		SPT-14	☒	9-9-10 (N = 19)
35		218			
	SAND (SP); pink and brown, subangular, loose, fine to coarse grained QUARTZ, mottled, wet		SPT-15	☒	5-7-4 (N = 11)
40	CLAYEY SILT (ML/CL); green, tan and brown, medium plasticity, soft, fine to coarse QUARTZ crystals	213			
	CLAYEY SILTY SAND (SM-SC); tan, gap graded, subangular, loose, fine to medium grained sand, homogeneous, wet		SPT-16	☒	3-3-4 (N = 7)
45		208			
			SPT-17	☒	WOH
50		203			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8991.57, E 6155.35
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 253.14
ELEVATION DATUM = NAVD 88

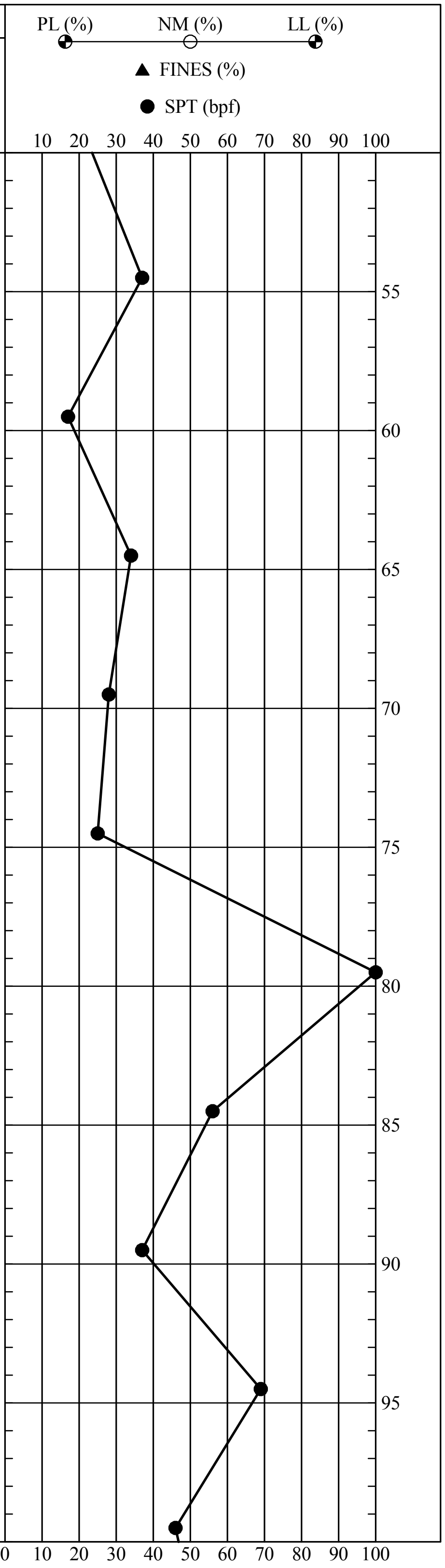
SOIL TEST BORING RECORD

BORING NO.: B-1005
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 4

MACTEC

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"
50	CLAYEY SILTY SAND (SM-SC); tan, gap graded, subangular, loose, fine to medium grained sand, homogeneous, wet	203			
	SILTY CLAYEY SAND (SC-SM); white, subangular, dense, fine to coarse graded sand with <20% shells, moist, +HCL		SPT-18	☒	8-14-23 (N = 37)
55		198			
	Same as above, <20% cemented shells, medium dense		SPT-19	☒	19-9-8 (N = 17)
60		193			
			SPT-20	☒	12-17-17 (N = 34)
65		188			
	CLAYEY SILT (ML/CL); grey, high plasticity, very stiff, homogeneous, +HCL		SPT-21	☒	9-14-14 (N = 28)
70	CLAYEY SILT (ML/CL); green, low to medium plasticity, very stiff, blocky, dry, +HCL Pocket Penetrometer = 2.75 tsf, >4.5 tsf, 1.5 tsf)	183			
	CLAYEY SILTY SAND (SM-SC); tan and grey, medium dense, very fine sand, with <5% shells, dry, +HCL		SPT-22	☒	8-11-14 (N = 25)
75		178			
	Same as above, very dense, >20% cemented shells		SPT-23	☒	50/1"
80		173			
	SAND (SP); white and pink, calcareous, weakly cemented, subangular, <20% shells, wet, +HCL		SPT-24	☒	22-27-29 (N = 56)
85		168			
	SILTY CLAYEY SAND (SC-SM); tan, grey and white, medium dense, calcareous, weak to moderately cemented, <20% shells, moist, +HCL		SPT-25	☒	14-19-18 (N = 37)
90		163			
	Same as above, very dense with intermittent shell layers		SPT-26	☒	22-35-34 (N = 69)
95		158			
	Same as above, dense		SPT-27	☒	21-24-22
100		153			



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8991.57, E 6155.35
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

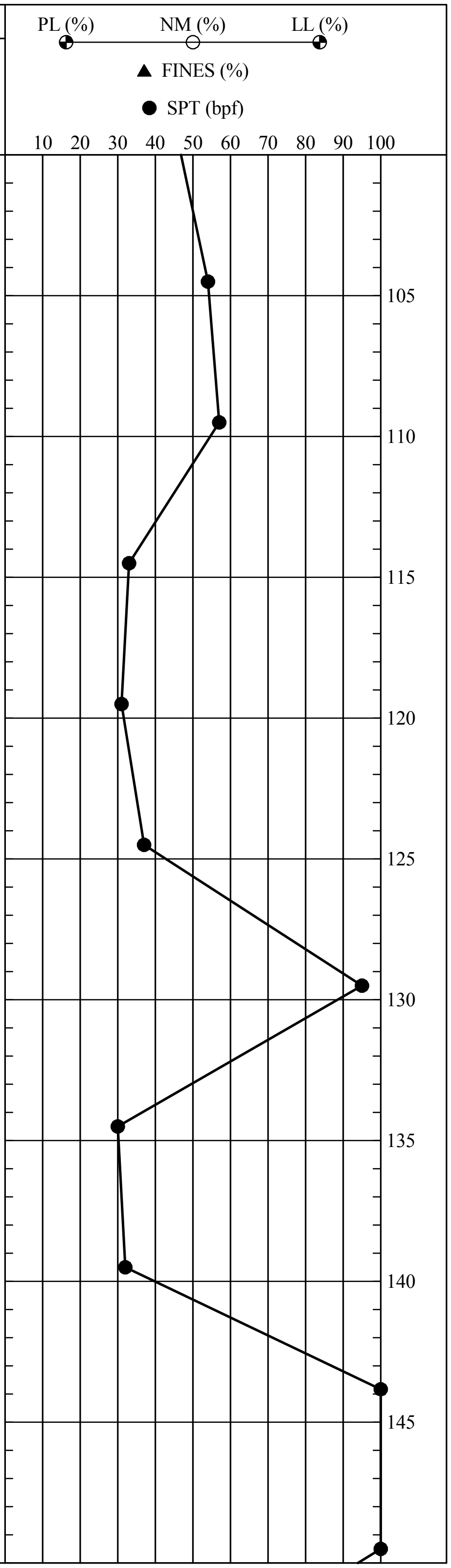
ELEVATION (ft) = 253.14
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1005
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 4

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
100	Same as above, dense		153			(N = 46)
	Same as above, very dense			SPT-28	☒	19-27-27 (N = 54)
105			148			
				SPT-29	☒	22-20-37 (N = 57)
110			143			
				SPT-30	☒	13-12-21 (N = 33)
115			138			
	SAND (SP); brown, calcareous, medium dense with traces of clay, silt and shells, +HCL			SPT-31	☒	15-15-16 (N = 31)
120			133			
	Same as above, with <20% shells			SPT-32	☒	13-21-16 (N = 37)
125			128			
	Same as above, very dense, with 20% shells			SPT-33	☒	14-47-48 (N = 95)
130			123			
	Same as above, medium dense			SPT-34	☒	15-14-16 (N = 30)
135			118			
	Same as above, with <20% shells			SPT-35	☒	15-11-21 (N = 32)
140			113			
	Same as above, very hard			SPT-36	☒	50/4"
145			108			
				SPT-37	☒	12-30-50/3"
150			103			



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8991.57, E 6155.35
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 253.14
ELEVATION DATUM = NAVD 88

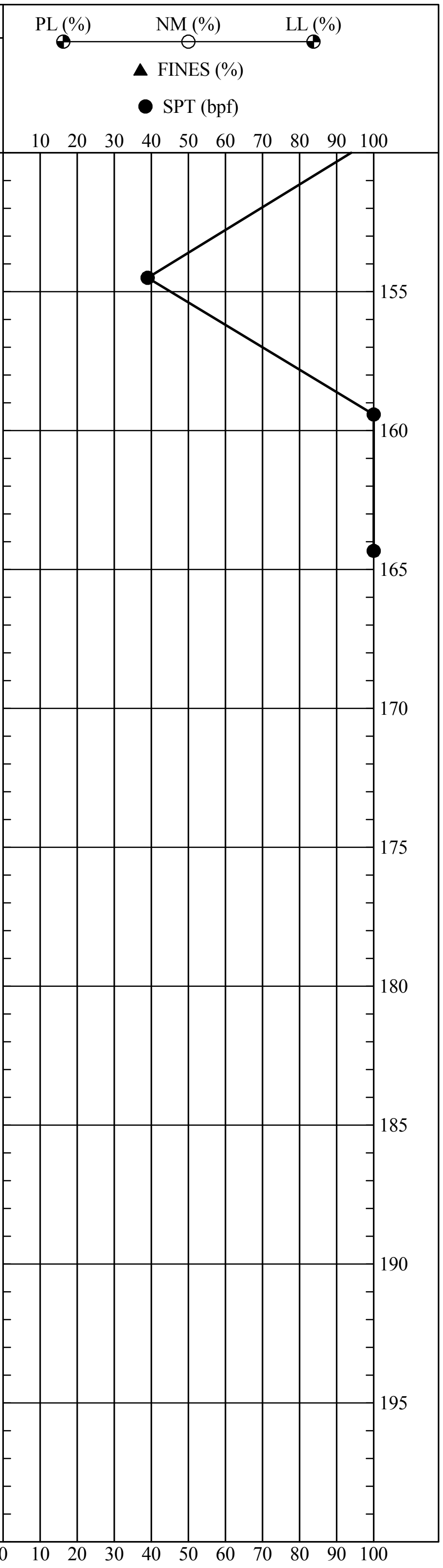
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1005
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 4

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
150	CLAYEY SILTY SAND (SM-SC); grey and brown, very dense, fine to coarse grained, with <20% shell fragments, +HCL		103			
	Top of Utley Limestone at 153.5'			SPT-38	☒	14-19-20 (N = 39)
155	SANDY SILT (ML); tan and white, dense, fine to medium grained, >20% shells, contains broken cemented shell hash/coquina, +HCL		98			
	Top of Lisbon Formation (Blue Bluff Marl) at 157' SILTY SAND (SM); green, very dense, very fine sand, flaky, dry, +HCL, with traces of clay			SPT-39	☒	23-50/5"
160	Pocket Penetrometer = >4.5 tsf, >4.5 tsf, >4.5 tsf		93			
	Same as above, <5% shells			SPT-40	☒	42-50/4"
	Boring Terminated at 164.3' on 9/13/05					
165			88			
170			83			
175			78			
180			73			
185			68			
190			63			
195			58			
200			53			



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8991.57, E 6155.35
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 253.14
ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

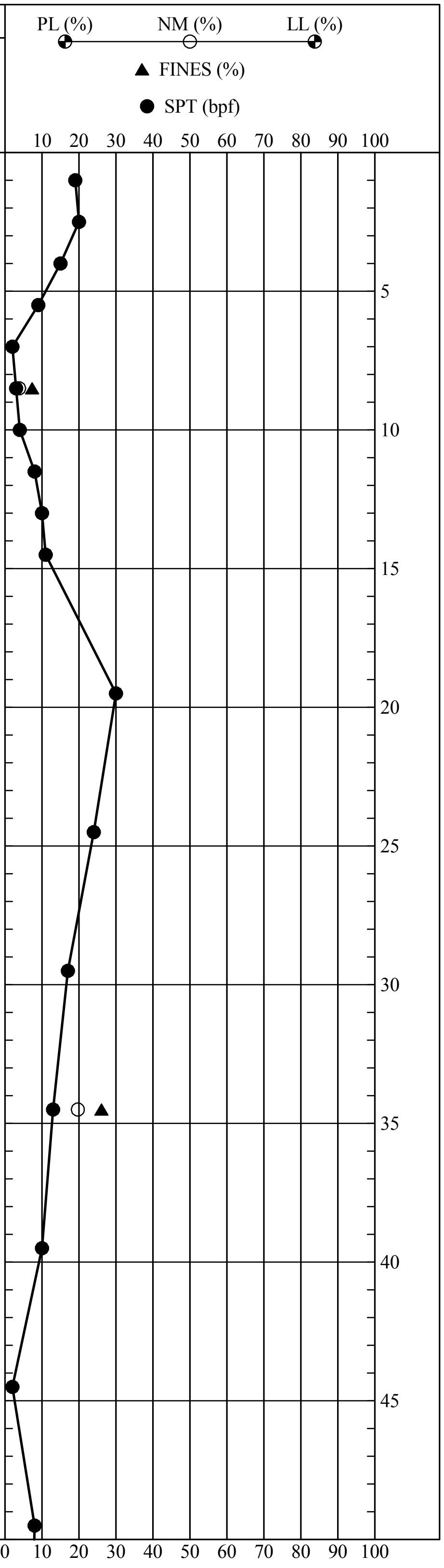
BORING NO.: B-1005
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 4 **OF** 4

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)
0	Top of Barnwell Formation at 0' SILTY SAND (SM); brown, subangular, medium dense, fine to medium grained Same as above, moist		256
5	Same as above, loose Same as above, very loose SAND WITH SILT (SP-SM); brown, very loose, subangular, fine to medium grained Pile driving analyzer placed on hammer during Sample #7		251
10	Same as above, brown and tan, loose Pile driving analyzer placed on hammer during Sample #8 Same as above, medium dense Pile driving analyzer placed on hammer during Sample #9		246
15			241
20	SAND (SP); tan and brown, subangular, medium dense, mottled, medium to fine grained		236
25	CLAYEY SAND (SP-SC); tan, brown and red, subangular, medium dense, mottled, fine to medium grained		231
30	Same as above, brown, homogeneous		226
35	SILTY SAND (SM); tan and brown, subangular, medium dense, stratified, fine to coarse grained		221
40	SAND (SP); brown, subangular, medium dense, lensed with green and brown SILTY CLAY Pile driving analyzer placed on hammer during Sample #15		216
45	SAND (SP); tan and borwn, medium grained subangular, very loose, lensed with layers of CLAYEY SILTY SAND Pile driving analyzer placed on hammer during Sample #16		211
50			206

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT-1	☒	6-9-10 (N = 19)
SPT-2	☒	10-10-10 (N = 20)
SPT-3	☒	5-7-8 (N = 15)
SPT-4	☒	22-4-5 (N = 9)
SPT-5	☒	4-1-1 (N = 2)
SPT-6	☒	3-2-1 (N = 3)
SPT-7	☒	4-2-2 (N = 4)
SPT-8	☒	3-4-4 (N = 8)
SPT-9	☒	4-5-5 (N = 10)
SPT-10	☒	4-6-5 (N = 11)
SPT-11	☒	8-16-14 (N = 30)
SPT-12	☒	8-12-12 (N = 24)
SPT-13	☒	7-8-9 (N = 17)
SPT-14	☒	4-6-7 (N = 13)
SPT-15	☒	4-6-4 (N = 10)
SPT-16	☒	1-1-1 (N = 2)
SPT-17	☒	1-4-4



DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 8810.26, E 7342.90 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/7/05

ELEVATION (ft) = 255.95

ELEVATION DATUM = NAVD 88

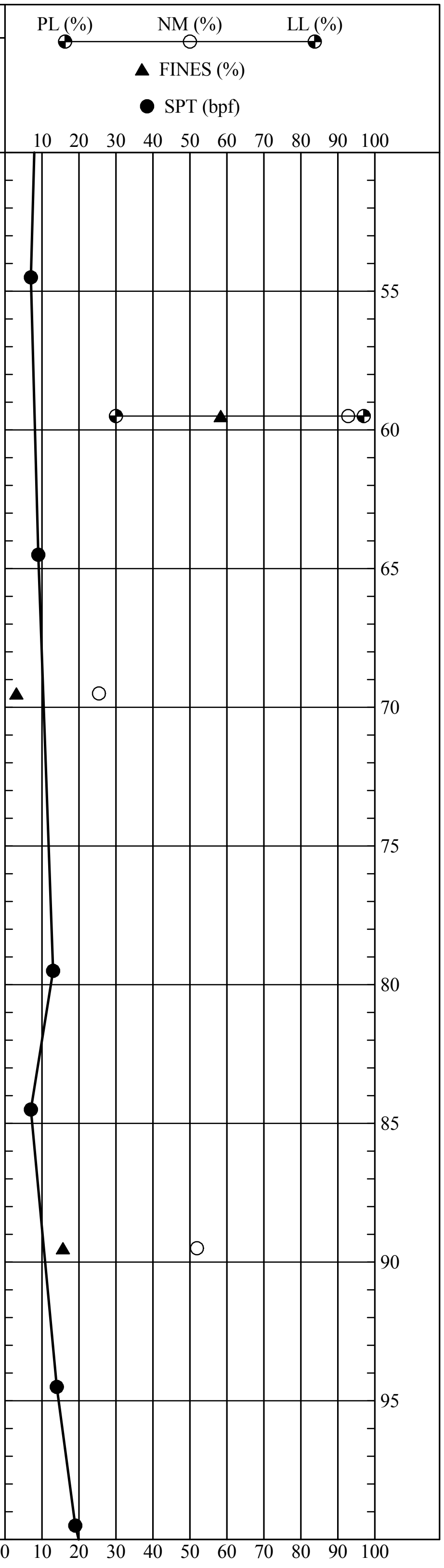
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1006
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 6, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	CLAYEY SILTY SAND (SM-SC); well graded, fine grained, subangular, loose, lensed with layers of CLAYEY SILT Pile driving analyzer placed on hammer during Sample #17		206			(N = 8)
55	SILT WITH SAND (ML); grey, pink and brown, non plastic to low plasticity, firm with lenses of very fine sand, dry, -HCL		201	SPT-18	☒	1-3-4 (N = 7)
60	SANDY SILTY CLAY (CH); grey, pink and brown, non plastic to low plasticity, firm with lenses of very fine sand, dry, -HCL		196	SPT-19	☒	WOH
65	CLAYEY SILTY SAND (SM-SC); grey, tan annd brown, subangular, loose, striated with layers of CLAYEY SILT and QUARTZ fragments		191	SPT-20	☒	3-4-5 (N = 9)
70	POORLY GRADED SAND (SP); brown, subangular, very loose, with QUARTZ fragments, medium to coarse grained, wet, -HCL		186	SPT-21	☒	WOH
75	CLAYEY SILTY SAND (SM-SC); tan and brown, fine, very loose with layers of CLAYEY SILT Installed 80' of casing and changed to a 2 7/8" bit		181	SPT-22	☒	WOH
80	SILTY SAND (SM); brown, subangular, medium dense, homogeneous, fine to medium grained, wet, -HCL with traces of CLAY Regained water circulation		176	SPT-23	☒	6-6-7 (N = 13)
85	SILTY SAND (SM); brown, medium grained, gap graded, subangular, loose, homogeneous, wet, -HCL		171	SPT-24	☒	3-4-3 (N = 7)
90	SILTY SAND (SM); tan, gap graded, subangular, very loose, fine to coarse grained, contains QUARTZ, moist, -HCL Loss of circulation at 86'		166	SPT-25	☒	WOH
95	SAND (SP); brown, subangular, medium dense, medium grained, lensed with tan and grey CLAYEY SILT, moist, -HCL Pile driving analizer placed on hammer during Sample #26		161	SPT-26	☒	5-6-8 (N = 14)
100			156	SPT-27	☒	5-7-12



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8810.26, E 7342.90 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/7/05

ELEVATION (ft) = 255.95
ELEVATION DATUM = NAVD 88

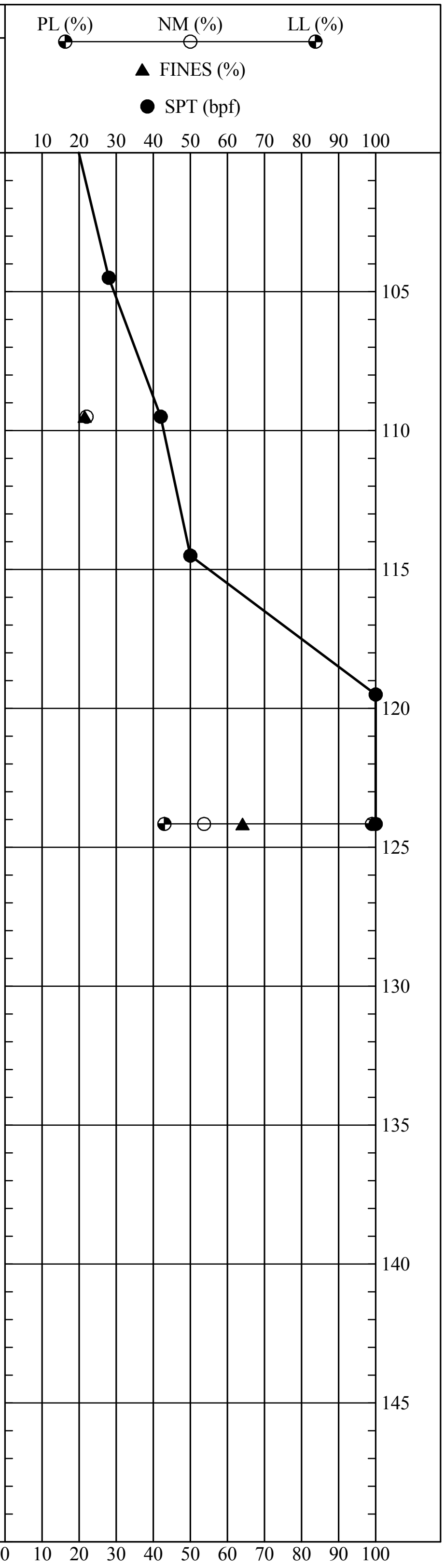
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1006
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 6, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT (1st 6" 2nd 6" 3rd 6")
100	Same as above, mottled grey, brown and tan Pile driving analizer placed on hammer during Sample #27		156			(N = 19)
	SAND (SP); tan and brown, subangular, medium dense, homogeneous, medium grained, wet			SPT-28	☒	18-17-11 (N = 28)
105	Pile driving analizer placed on hammer during Sample #28 Difficult drilling		151			
	Top of Utley Limestone at 108.5 feet SILTY SAND (SM); tan and white, dense, contains appreciable cemented shells, fine grained, wet, +HCL			SPT-29	☒	19-15-27 (N = 42)
110			146			
				SPT-30	☒	5-13-37 (N = 50)
115			141			
	Top of Lisbon Formation (Blue Bluff Marl) at 118.5 CLAYEY SILT (ML/CL); green, low to medium plasticity, hard, dry, +HCL			SPT-31	☒	16-34-50/5"
120			136			
	SILT WITH SAND (ML); Green, hard, dry, +HCL Boring Terminated at 124.1' on 9/8/05			SPT-32	☒	10-5/2"
125			131			
130			126			
135			121			
140			116			
145			111			
150			106			



DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 8810.26, E 7342.90 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/7/05

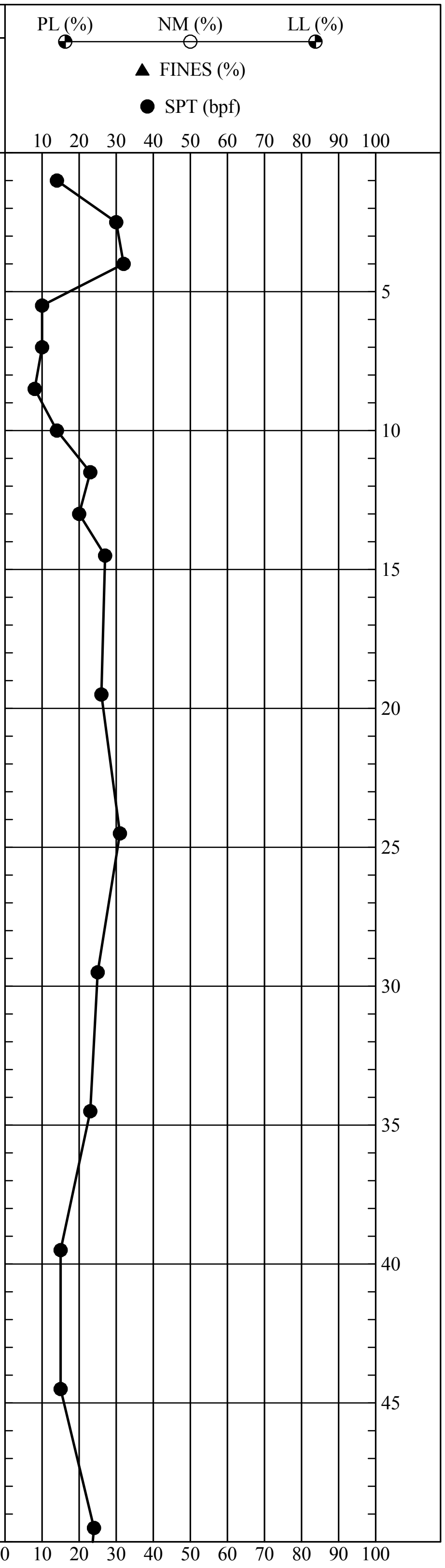
ELEVATION (ft) = 255.95
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1006
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 6, 2005
PROJECT NO.: 6141-05-0227
PAGE 3 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
0	4" TOPSOIL 4" CRUSHED STONE with fines	221	SPT-1	☒	9-8-6 (N = 14)
	SAND (SP); light brown, coarse SAND (SP); light and medium brown, coarse		SPT-2	☒	9-13-17 (N = 30)
	SILTY SAND (SM); brown, loose		SPT-3	☒	14-15-17 (N = 32)
5		216	SPT-4	☒	4-4-6 (N = 10)
			SPT-5	☒	7-4-6 (N = 10)
			SPT-6	☒	3-4-4 (N = 8)
	Same as above, brown and red, firm		SPT-7	☒	7-7-7 (N = 14)
10		211			
	Same as above, reddish brown, very firm		SPT-8	☒	8-10-13 (N = 23)
	Same as above, firm		SPT-9	☒	10-10-10 (N = 20)
	Same as above, very firm		SPT-10	☒	14-12-15 (N = 27)
15		206			
			SPT-11	☒	12-12-14 (N = 26)
20		201			
	SILTY CLAY (CL-ML); light and medium brown, hard		SPT-12	☒	9-9-22 (N = 31)
25		196			
	CLAYEY SAND (SC); light and reddish brown, very firm, coarse to fine		SPT-13	☒	9-12-13 (N = 25)
30		191			
	CLAYEY SILTY SAND (SM-SC); light and medium brown, very firm		SPT-14	☒	8-12-11 (N = 23)
35		186			
	CLAYEY SILT (ML/CL); light brown, stiff		SPT-15	☒	7-8-7 (N = 15)
40		181			
	CLAYEY SILTY SAND (SM-SC); light brown, firm		SPT-16	☒	5-7-8 (N = 15)
45		176			
	SILTY SAND (SM); tan and light brown, very firm		SPT-17	☒	12-9-15
50		171			



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7662.29, E 7120.13 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 8/31/05
	ELEVATION (ft) = 221.02
	ELEVATION DATUM = NAVD 88

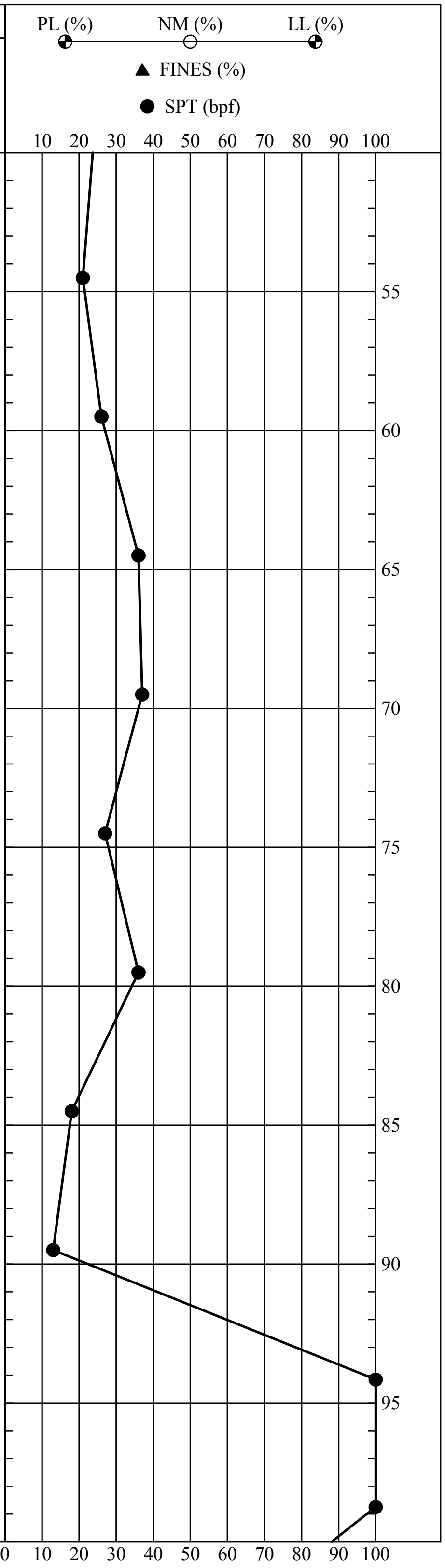
SOIL TEST BORING RECORD

BORING NO.: B-1007
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227

PAGE 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
50	SILTY SAND (SM); tan and light brown, very firm	171			(N = 24)
55		166	SPT-18	☒	4-9-12 (N = 21)
60	▼	161	SPT-19	☒	10-12-14 (N = 26)
65		156	SPT-20	☒	16-16-20 (N = 36)
	CLAYEY SILTY SAND (SC-SM); tan and white, very dense		SPT-21	☒	11-26-11 (N = 37)
70	SAND (SP); light to medium brown, poorly graded, very firm	151			
75		146	SPT-22	☒	9-10-17 (N = 27)
	Same as above, tan and pink, dense				
80		141	SPT-23	☒	17-18-18 (N = 36)
	Same as above, tan, firm				
85		136	SPT-24	☒	8-11-7 (N = 18)
	CLAY (CL); tan, thinly laminated				
90		131	SPT-25	☒	6-6-7 (N = 13)
	Top of Lisbon Formation (Blue Bluff Marl) at 92.5' SANDY CLAYEY SILT (ML-CL); grey, very hard, laminated		SPT-26	☒	21-50/2"
95		126			
			SPT-27	☒	50/3"
100		121			



DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7662.29, E 7120.13 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 8/31/05

ELEVATION (ft) = 221.02

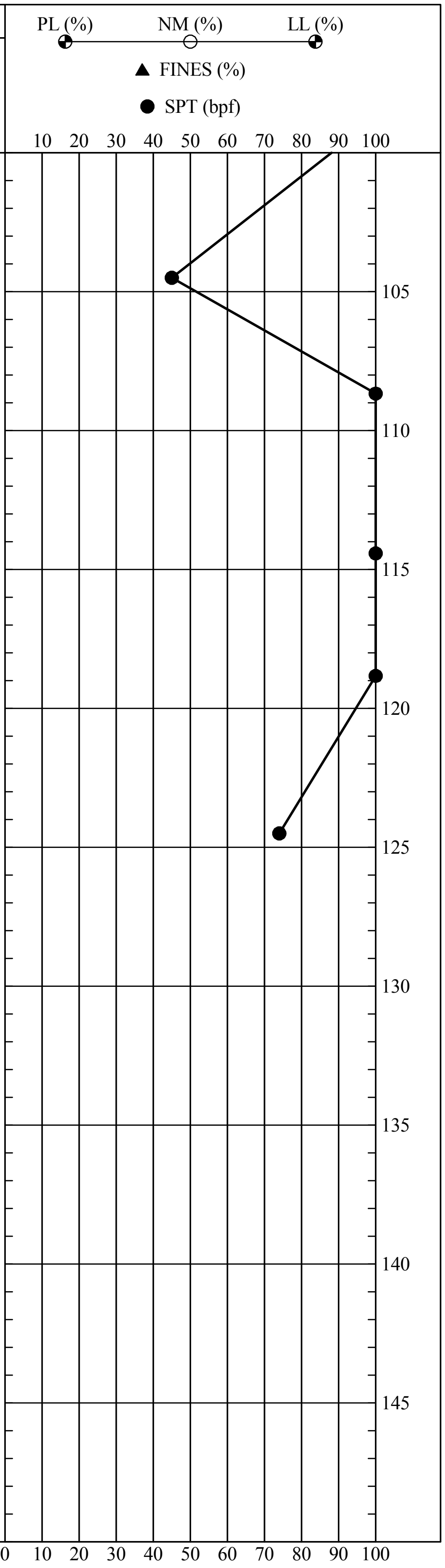
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1007
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
100	SANDY CLAYEY SILT (ML-CL); grey, very hard, laminated		121			
	Lost circulation at 102'					
				SPT-28	☒	13-20-25 (N = 45)
105			116			
				SPT-29	☒	50/2"
110			111			
				SPT-30	☒	48-50/5"
115			106			
				SPT-31	☒	50/4"
120			101			
				SPT-32	☒	35-37-37 (N = 74)
125	Boring Terminated at 125' on 8/31/05		96			
130			91			
135			86			
140			81			
145			76			
150			71			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7662.29, E 7120.13 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 8/31/05
	ELEVATION (ft) = 221.02
	ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

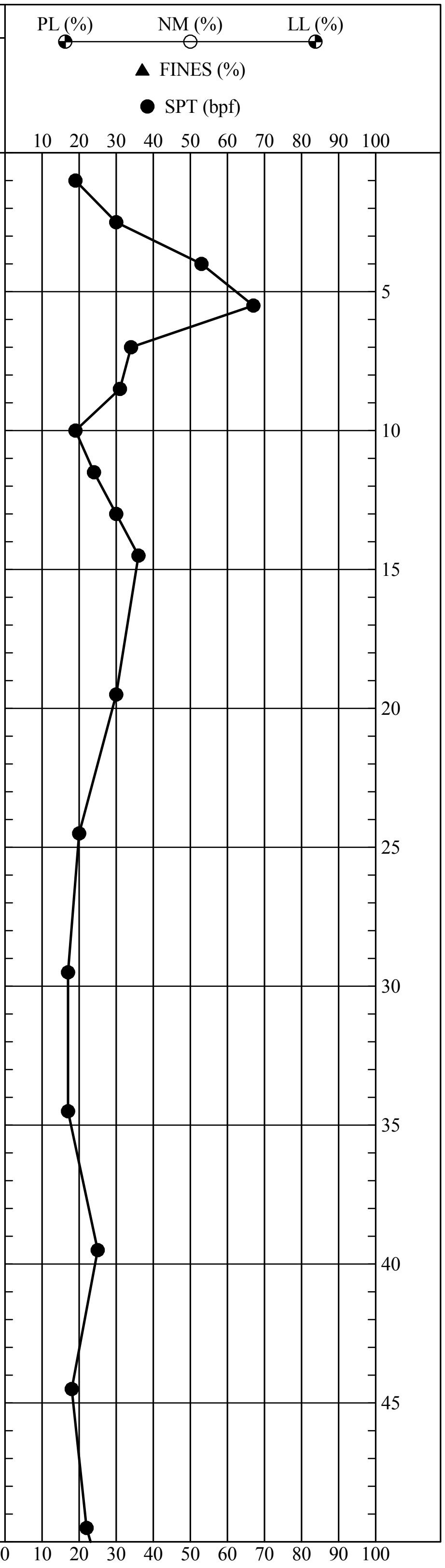
SOIL TEST BORING RECORD

BORING NO.: B-1007
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: August 30, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)
0	5" TOPSOIL Top of the Barnwell Formation		220
	SAND WITH SILT (SP-SM); red, firm		
	Same as above, very firm		
	Same as above, very dense		
5			215
	CLAYEY SAND (SC); red and brown, dense		
	SILTY SAND (SM); mottled red and brown, dense		
	Same as above, red, firm		
10			210
	CLAYEY SAND (SC); red, very firm		
	SAND (SP); light brown, dense		
15			205
	SAND WITH SILT (SP-SM); mottled orange and light brown, very firm		
20			200
	CLAYEY SILTY SAND (SM-SC); red, firm		
25	SAND WITH SILT (SP-SM); light brown, medium dense		195
	SAND WITH SILT (SP-SM); tan and light brown, firm		
30			190
	SANDY SILT (ML); tan and light brown, with a sand seam and traces of lignite		
35			185
	SAND WITH SILT (SP-SM); tan and light brown, very firm, with thin CLAY lamintaions		
40			180
	SAND WITH SILT (SP-SM); brown, firm		
45	SILTY CLAY (CL-ML); light brown, firm		175
	SANDY FAT CLAY (CH); brown, firm, with traces of QUARTZ, medium plastic		
50			170

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT-1	☒	7-7-12 (N = 19)
SPT-2	☒	13-15-15 (N = 30)
SPT-3	☒	15-23-30 (N = 53)
SPT-4	☒	26-28-39 (N = 67)
SPT-5	☒	12-15-19 (N = 34)
SPT-6	☒	11-14-17 (N = 31)
SPT-7	☒	9-9-10 (N = 19)
SPT-8	☒	13-11-13 (N = 24)
SPT-9	☒	11-14-16 (N = 30)
SPT-10	☒	13-17-19 (N = 36)
SPT-11	☒	11-15-15 (N = 30)
SPT-12	☒	13-11-9 (N = 20)
SPT-13	☒	8-8-9 (N = 17)
SPT-14	☒	5-8-9 (N = 17)
SPT-15	☒	10-11-14 (N = 25)
SPT-16	☒	11-9-9 (N = 18)
SPT-17	☒	4-10-12



DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7670.93, E 7996.15 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/2/05

ELEVATION (ft) = 219.51
ELEVATION DATUM = NAVD 88

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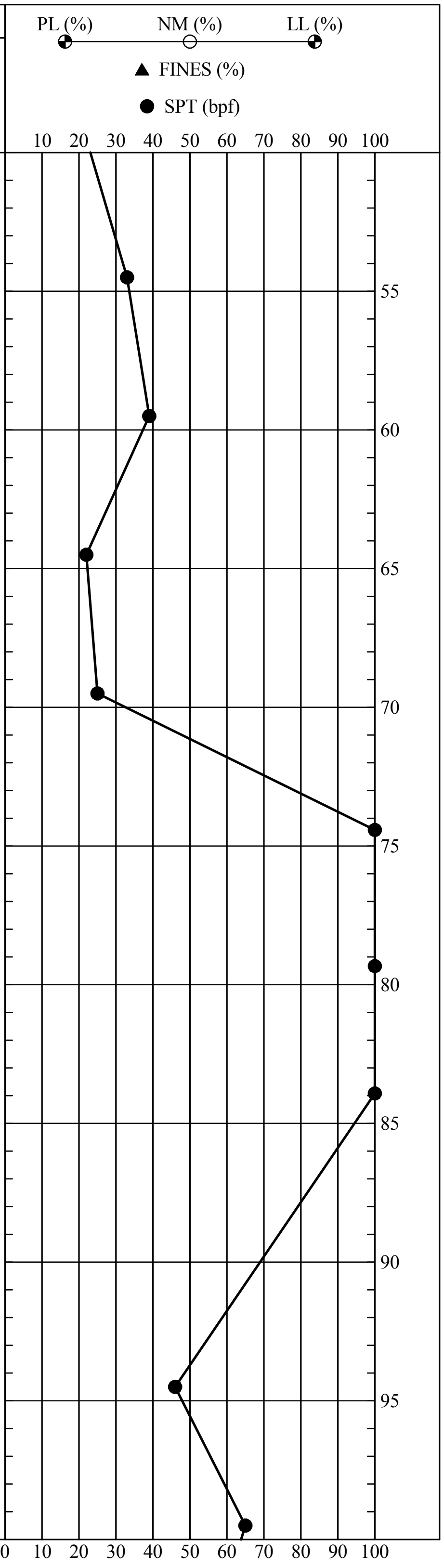
SOIL TEST BORING RECORD

BORING NO.: B-1008
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	SANDY FAT CLAY (CH); brown, firm, with traces of QUARTZ, medium plastic	170			(N = 22)
	SILTY SAND (SM); tan and light brown with thin CLAY laminations		SPT-18	☒	13-15-18 (N = 33)
55		165			
	SAND WITH SILT (SP-SM); tan and dark brown, subrounded to subangular, fine to coarse, dense, wet, black Manganese staining		SPT-19	☒	14-19-20 (N = 39)
60		160			
	CLAYEY SAND (SC); tan and light green, subrounded, very fine to fine, medium dense, moist, -HCL		SPT-20	☒	9-11-11 (N = 22)
65		155			
	Same as above, with a 6" seam of light green elastic SILT (MH) at 68.5' to 69', thin SILT laminations throughout, trace shell hash, +HCL		SPT-21	☒	9-11-14 (N = 25)
70		150			
	SAND WITH SILT (SP-SM); tan, very dense, fine to coarse with traces of shell hash, +HCL		SPT-22	☒	30-50/5"
75		145			
	Top of Utley Limestone at 77'				
	Lost circulation at 77' CLAYEY SAND (SC); light brown and tan with cemented shells, +HCL		SPT-23	☒	30-50/4"
80		140			
	Thickened drilling fluid		SPT-24	☒	50/5"
85		135			
90		130			
	Top of Lisbon Formation (Blue Bluff Marl) at 93.5		SPT-25	☒	23-27-19 (N = 46)
95	SANDY CLAYEY SILT (ML); grey, hard, fissured, contains shell hash Installed casing to 92' and changed to a 2 7/8" roller bit	125			
			SPT-26	☒	18-24-41
100		120			



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 7670.93, E 7996.15 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/2/05

ELEVATION (ft) = 219.51

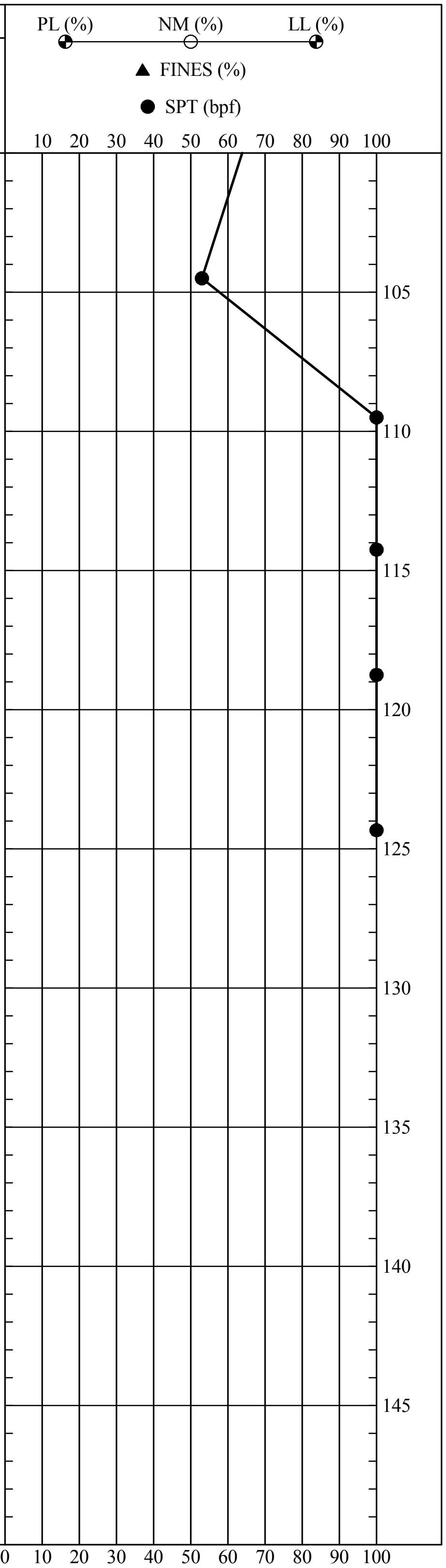
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1008
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6"
100	SANDY CLAYEY SILT (ML); grey, hard, fissured, contains shell hash	120		(N = 65)
105		115	SPT-27	18-23-30 (N = 53)
110		110	SPT-28	17-21-50/3"
115		105	SPT-29	33-50/3"
120		100	SPT-30	50/3"
125		95	SPT-31	26-50/4"
125	Boring Terminated at 124.5' on 9/7/05	95		
130		90		
135		85		
140		80		
145		75		
150		70		



DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 7670.93, E 7996.15 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/2/05

ELEVATION (ft) = 219.51
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1008
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

SOIL CLASSIFICATION AND REMARKS

SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.

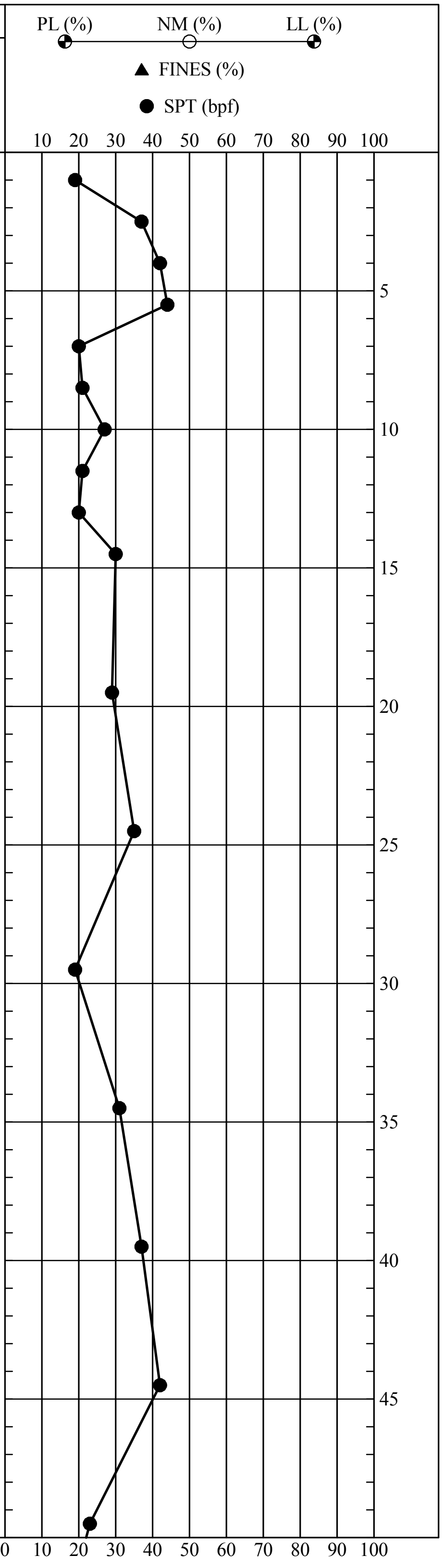
SOIL CLASSIFICATION AND REMARKS
3" CRUSH STONE with fines
Top of Barnwell Formation
SAND WITH SILT (SP-SM); red, firm
Same as above, dense
Same as above, red and white, dense
Same as above, with a thin lamination of yellow SILTY SAND
SAND WITH SILT (SP-SM); red and white, firm
Same as above, very firm
Same as above, very firm, coarse grained
Same as above, with a 1.5" thick layer of yellow SILTY SAND
SAND WITH SILT (SP-SM); light and medium brown, firm
Same as above, very firm
SAND WITH SILT (SP-SM); mottled light and dark brown, very firm
SAND WITH SILT (SP-SM); dark brown, dense, with thin lamintaions of white and light brown SILTY SAND (SM)
SAND WITH SILT (SP-SM); dark brown, firm, with thin laminations of white SILTY SAND
SAND WITH SILT (SP-SM); light and dark brown, dense
Same as above, light and medium brown
SANDY FAT CLAY (CH); light brown, very stiff

DEPTH (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

ELEV (ft): 220, 215, 210, 205, 200, 195, 190, 185, 180, 175, 170

SAMPLES

IDENT	TYPE	N-COUNT (1st 6" 2nd 6" 3rd 6")
SPT-1	☒	13-9-10 (N = 19)
SPT-2	☒	15-17-20 (N = 37)
SPT-3	☒	20-20-22 (N = 42)
SPT-4	☒	26-23-21 (N = 44)
SPT-5	☒	5-10-10 (N = 20)
SPT-6	☒	8-10-11 (N = 21)
SPT-7	☒	9-14-13 (N = 27)
SPT-8	☒	16-10-11 (N = 21)
SPT-9	☒	7-9-11 (N = 20)
SPT-10	☒	10-13-17 (N = 30)
SPT-11	☒	10-12-17 (N = 29)
SPT-12	☒	10-18-17 (N = 35)
SPT-13	☒	10-10-9 (N = 19)
SPT-14	☒	9-14-17 (N = 31)
SPT-15	☒	7-14-23 (N = 37)
SPT-16	☒	15-19-23 (N = 42)
SPT-17	☒	8-9-14



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 6000.54, E 6361.26 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL
	ELEVATION (ft) = 220.39
	ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

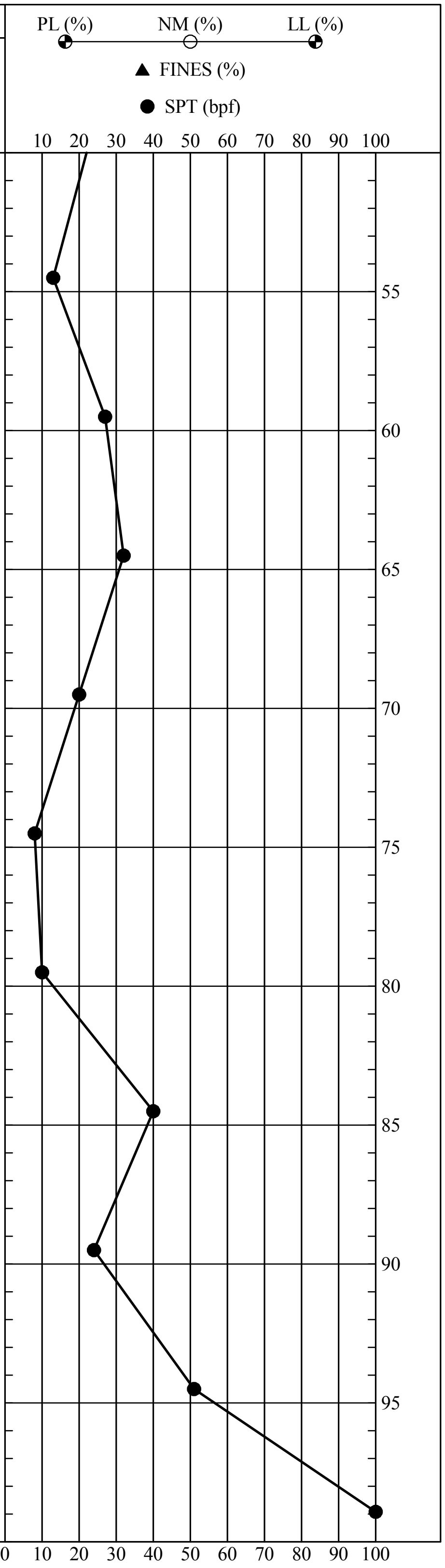
SOIL TEST BORING RECORD

BORING NO.: B-1009
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 13, 2005
PROJECT NO.: 6141-05-0227

PAGE 1 **OF** 2

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	SAND WITH SILT (SP-SM); light brown and light grey, medium dense	170		(N = 23)
	CLAYEY SAND (SC); black and grey			
55	SILTY SAND (SM); thinly laminated black, grey, light and medium brown, firm, with traces of white CLAY	165	SPT-18	5-6-7 (N = 13)
	CLAYEY SILTY SAND (SM-SC); black, white and brown			
60	SILTY SAND (SM); light brown, very firm	160	SPT-19	7-11-16 (N = 27)
65	SAND (SP); light brown, dense	155	SPT-20	15-16-16 (N = 32)
70	SILTY SAND (SM); light brown, firm, fine to medium grained	150	SPT-21	12-11-9 (N = 20)
75	CLAYEY SAND (SC); stratified light brown and grey and pink, with thin black CLAY laminations	145	SPT-22	4-4-4 (N = 8)
80	SILTY CLAYEY SAND (SC-SM); light brown, loose, fine to medium grained	140	SPT-23	5-5-5 (N = 10)
85	SAND WITH SILT (SP-SM); dark brown and white, dense, with shell hash	135	SPT-24	10-10-30 (N = 40)
90	CLAYEY SILT (ML/CL); light brown, sitff	130	SPT-25	8-8-16 (N = 24)
	Top of Lisbon Formation (Blue Bluff Marl) at 92'			
95	SANDY CLAYEY SILT (ML/CL); grey, hard, fissured	125	SPT-26	22-20-31 (N = 51)
			SPT-27	50/5"
100	Boring Terminated at 98.9' on 9/13/05	120		



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 6000.54, E 6361.26
+HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

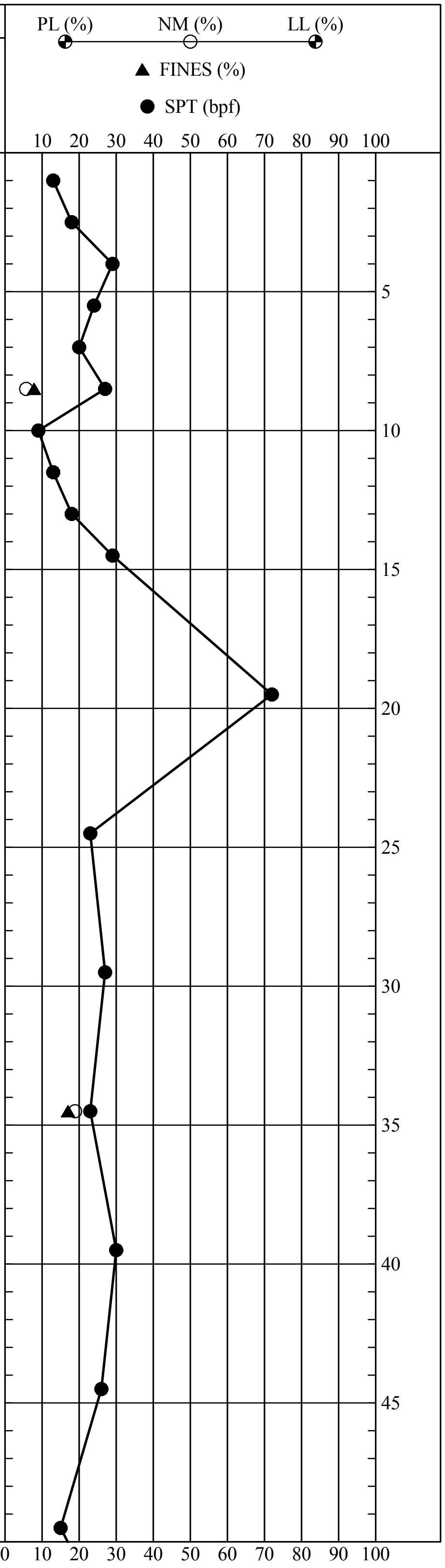
ELEVATION (ft) = 220.39
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1009
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 13, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 2

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Top of Barnwell Formation at 0'	219			
	SAND WITH SILT (SP-SM); red and purple, firm		SPT-1	☒	6-6-7 (N = 13)
			SPT-2	☒	6-7-11 (N = 18)
	Same as above, very firm		SPT-3	☒	13-13-16 (N = 29)
5		214	SPT-4	☒	13-11-13 (N = 24)
	SILTY SAND (SM); mottled red and purple and brown, firm		SPT-5	☒	8-10-10 (N = 20)
	Same as above, very firm		SPT-6	☒	12-12-15 (N = 27)
	Same as above, loose		SPT-7	☒	5-5-4 (N = 9)
10		209			
	SILTY SAND (SM); purple		SPT-8	☒	6-6-6 (N = 13)
	Same as above, mottled gray and light and medium brown				
	SAND WITH SILT (SP-SM); mottled red and purple, with stratifications of mottled gray, light brown, and medium brown SILTY SAND		SPT-9	☒	3-6-12 (N = 18)
			SPT-10	☒	19-17-12 (N = 29)
15	SAND WITH SILT (SP-SM); red, purple, medium brown, light brown, very firm ▼	204			
	Same as above, mottled red and brown, very dense		SPT-11	☒	22-35-37 (N = 72)
20		199			
	Same as above, mottled red and medium brown, very firm		SPT-12	☒	11-11-12 (N = 23)
25	Same as above, laminated light and medium brown	194			
	SAND (SP); mottled red and brown, very firm		SPT-13	☒	10-13-14 (N = 27)
30		189			
	SILTY SAND (SM); yellow, very firm, with thin light gray SAND laminations		SPT-14	☒	9-10-13 (N = 23)
35		184			
	SAND (SP); brown and yellow, very firm		SPT-15	☒	15-15-15 (N = 30)
40		179			
	SAND (SP); light and medium brown, very firm		SPT-16	☒	10-13-13 (N = 26)
45		174			
	SAND WITH SILT (SP-SM); light brown, firm		SPT-17	☒	5-7-8
50		169			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 6000.12, E 7279.68 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/9/05
	ELEVATION (ft) = 218.60
	ELEVATION DATUM = NAVD 88

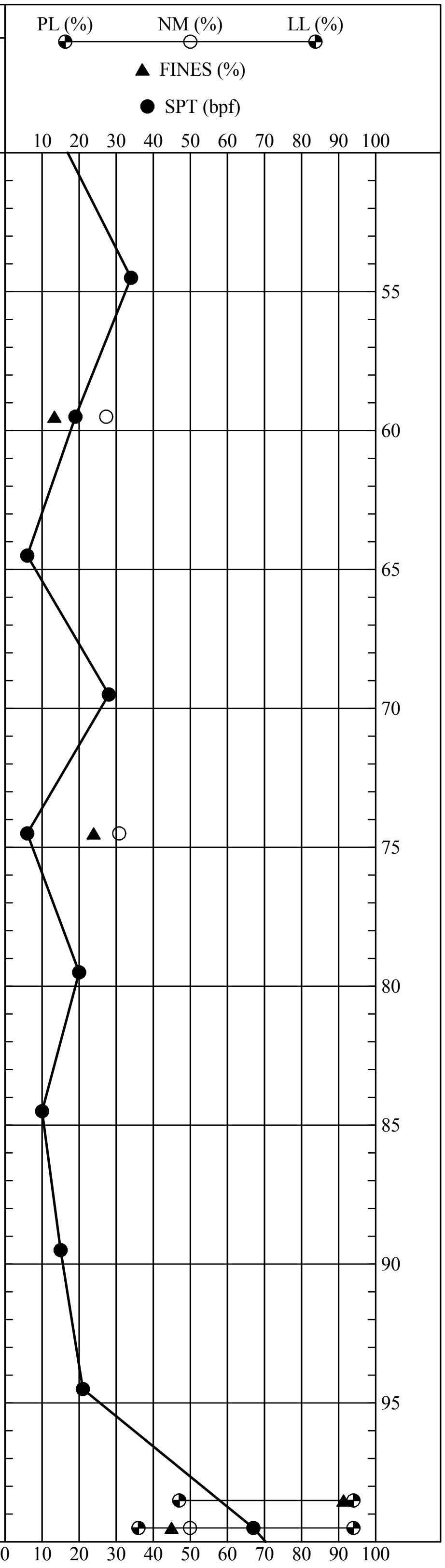
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1010
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
50	SAND WITH SILT (SP-SM); light brown, firm	169			(N = 15)
	Same as above, laminated light and medium brown, with Manganese staining		SPT-18	☒	7-13-21 (N = 34)
55		164			
	SILTY SAND (SM) - light brown, firm		SPT-19	☒	10-9-10 (N = 19)
60		159			
	CLAYEY SILTY SAND (SM-SC); laminated light and medium brown, loose, with Manganese staining		SPT-20	☒	2-1-5 (N = 6)
65	Soft zone from 63.5' to 65.5'	154			
	SAND WITH SILT (SP-SM); light brown, very firm		SPT-21	☒	10-13-15 (N = 28)
70		149			
	SILTY SAND (SM); gray, purple, loose				
	Same as above, light and medium brown, loose		SPT-22	☒	4-2-4 (N = 6)
75		144			
	SAND WITH SILT (SP-SM); light brown, firm		SPT-23	☒	6-8-12 (N = 20)
80		139			
	Same as above, loose		SPT-24	☒	4-4-6 (N = 10)
85		134			
	SILTY SAND (SM); light brown, firm, with a 4" thick layer of black SAND with SILT (SP-SM)		SPT-25	☒	4-6-9 (N = 15)
90		129			
	CLAYEY SILT (ML/CL); light brown, firm, with traces of brown SILTY SAND		SPT-26	☒	9-9-12 (N = 21)
95		124			
	Top of Lisbon Formation (Blue Bluff Marl) at 97'				
	ELASTIC SILT (MH); gray, firm, laminated		SPT-27	☒	41-34-33
100		119			



DRILLER: Robert Banks (MACTEC)
EQUIPMENT: CME-55 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 4 inches
REMARKS: Plant Grid: N 6000.12, E 7279.68 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/9/05

ELEVATION (ft) = 218.60
ELEVATION DATUM = NAVD 88

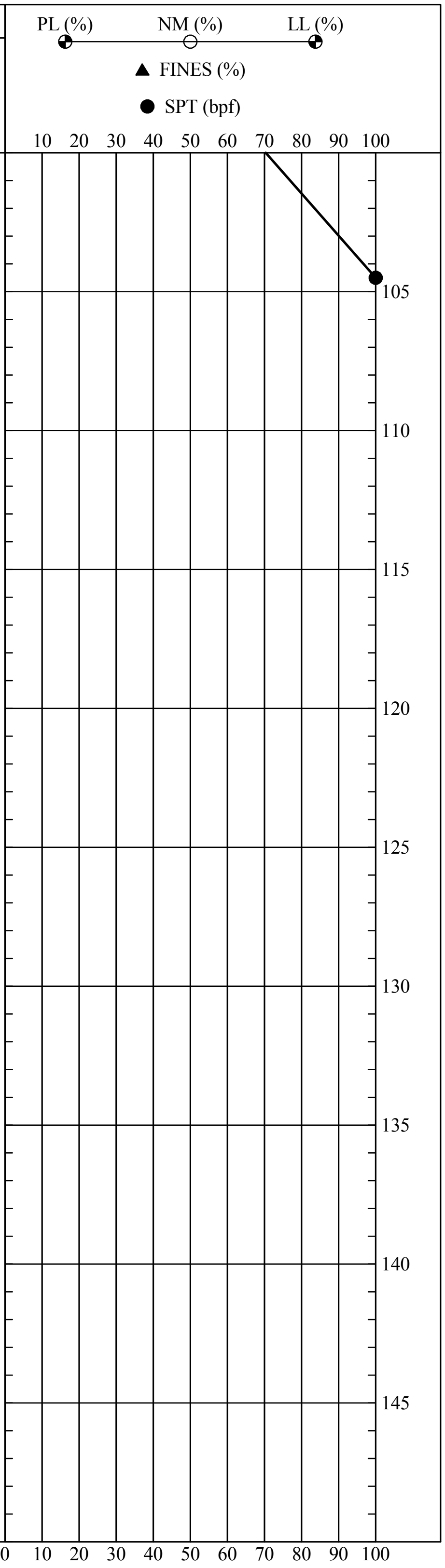
THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

BORING NO.: B-1010
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"
100	Pocket Penetrometer = 2.75 tsf, 1.5 tsf, 1.75 tsf and 2.0 tsf Pocket Penetrometer = 3.0 tsf, 3.5 tsf, >4.5 tsf and > 4.5 tsf		119			(N = 67)
	SANDY CLAYEY SILT (ML/CL); gray, firm, laminated Pocket Penetrometer = >4.5 tsf, >4.5 tsf and >4.5 tsf			SPT-28	☒	31-50/4"
105	Boring terminated at 104.5 feet on 9/9/05		114			
110			109			
115			104			
120			99			
125			94			
130			89			
135			84			
140			79			
145			74			
150			69			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

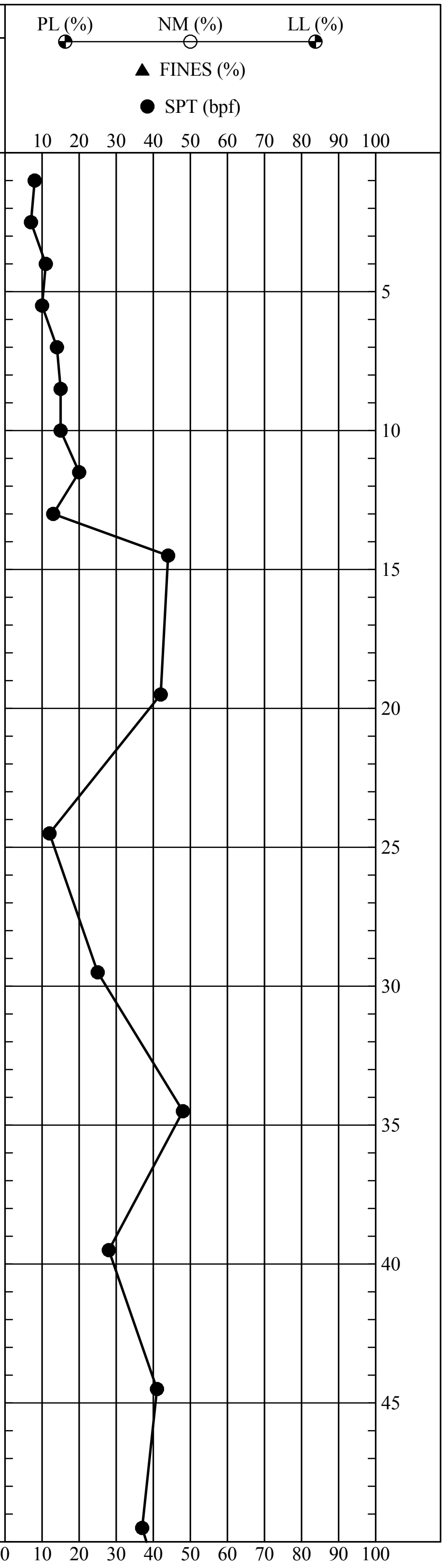
DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 6000.12, E 7279.68 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL Water depth represents depth of water and mud as measured on 9/9/05 ELEVATION (ft) = 218.60 ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1010
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 8, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	N-COUNT 1st 6" 2nd 6" 3rd 6"
0	Top of Barnwell Formation at 0'	219		
	SILTY SAND (SM); brown, subangular QTZ, loose, fine to medium, dry to wet		SPT-1	2-5-3 (N = 8)
			SPT-2	4-3-4 (N = 7)
	CLAYEY SILTY SAND (SM-SC); tan brown, subangular QTZ, medium dense, fine		SPT-3	3-4-7 (N = 11)
5	CLAYEY SILT (ML-CL); tan brown, low to medium plastic, firm	214	SPT-4	3-5-5 (N = 10)
			SPT-5	9-7-7 (N = 14)
	Same as above, tan grey		SPT-6	7-8-7 (N = 15)
	Same as above, fissured		SPT-7	8-7-8 (N = 15)
10		209		
	Same as above, contains QTZ SAND		SPT-8	11-8-12 (N = 20)
	SAND (SP); tan brown, angular, medium dense, fine to coarse with cemented shell hash		SPT-9	11-7-6 (N = 13)
	Same as above, w/weathered shell layers, dense, +HCL		SPT-10	5-26-18 (N = 44)
15		204		
			SPT-11	20-20-22 (N = 42)
20		199		
	Same as above, medium dense		SPT-12	25-7-5 (N = 12)
25		194		
	CLAYEY SILT (ML-CL); grey, medium to high plastic, very stiff, with some vf SAND and trace coarse SAND		SPT-13	6-12-13 (N = 25)
30	SILTY SAND (SM); grey, brown and white, well graded, medium dense, layers of weathered shell, +HCL, slightly CLAYEY	189		
	SILTY SAND (SM); tan, grey and brown, well graded, subangular, dense, laminated, wet, +HCL, some shell fragments		SPT-14	15-23-25 (N = 48)
35		184		
			SPT-15	14-13-15 (N = 28)
40		179		
	SAND (SP); grey, gap graded, subangular, dense, laminated with shells, wet, +HCL		SPT-16	16-22-19 (N = 41)
45		174		
	CLAYEY SILTY SAND (SM-SC); tan, white and grey, angular, dense, laminated with shells, dry, +HCL		SPT-17	21-22-15
50		169		



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 8741.13, E 8378.01 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 219.38
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1011
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227

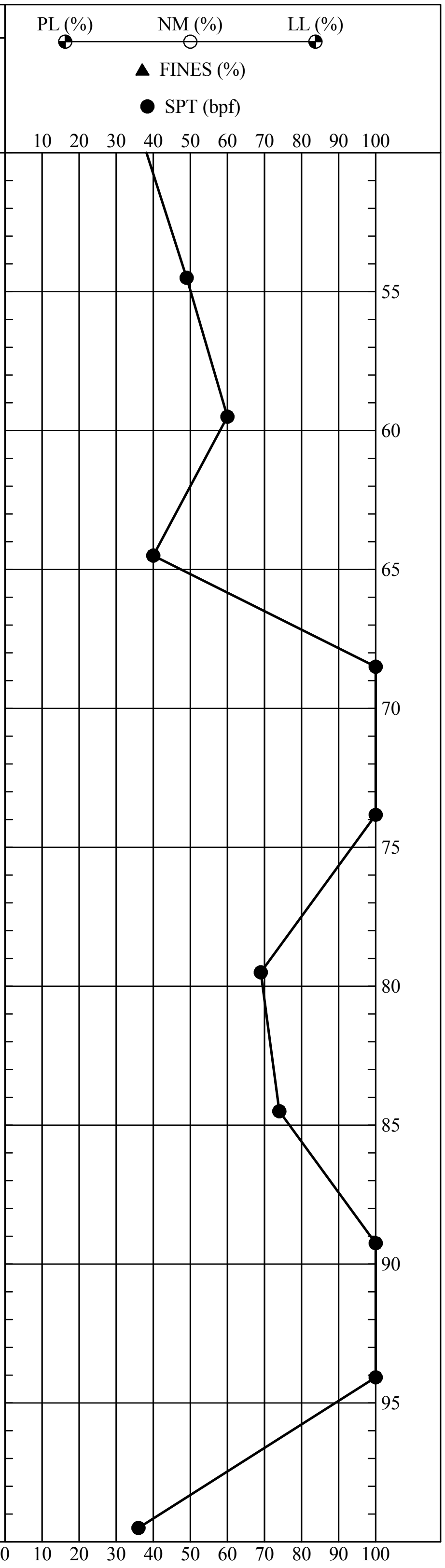
PAGE 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)
50	CLAYEY SILTY SAND (SM-SC); tan, white and grey, angular, dense, laminated with shells, dry, +HCL	169
	Same as above, white and grey, dense to very dense	
55		164
60		159
	SAND (SP); pink, medium, dense, wet, +HCL	
65		154
	Top of Utley Limestone at 68.5'	
70	NO RECOVERY, drilled through intermittent layers of hard shelly material	149
	SILTY SAND (SM); grey and white, very fine, poorly graded, dense, dry, +HCL, with shell fragments	
75		144
	Top of Lisbon Formation (Blue Bluff Marl) at 78'	
80	SILT (ML); green, non plastic, hard, with very fine SAND, dry, +HCL	139
	Same as above, slightly CLAYEY with traces of shells	
85		134
	difficult drilling 89' to 92'	
90		129
95		124
100		119

SAMPLES

IDENT	N-COUNT (1st 6" 2nd 6" 3rd 6")
	(N = 37)
SPT-18	20-27-22 (N = 49)
SPT-19	25-35-25 (N = 60)
SPT-20	10-16-24 (N = 40)
SPT-21	50/0"
SPT-22	50/4"
SPT-23	12-32-37 (N = 69)
SPT-24	12-27-47 (N = 74)
SPT-25	13-50/3"
SPT-26	39-50/1"
SPT-27	12-19-17



DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 8741.13, E 8378.01 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 219.38
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1011
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
100	Boring Terminated at 100' on 9/2/05		119			(N = 36)	
105			114				105
110			109				110
115			104				115
120			99				120
125			94				125
130			89				130
135			84				135
140			79				140
145			74				145
150			69				0 10 20 30 40 50 60 70 80 90 100

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 8741.13, E 8378.01 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL
	ELEVATION (ft) = 219.38
	ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

SOIL TEST BORING RECORD

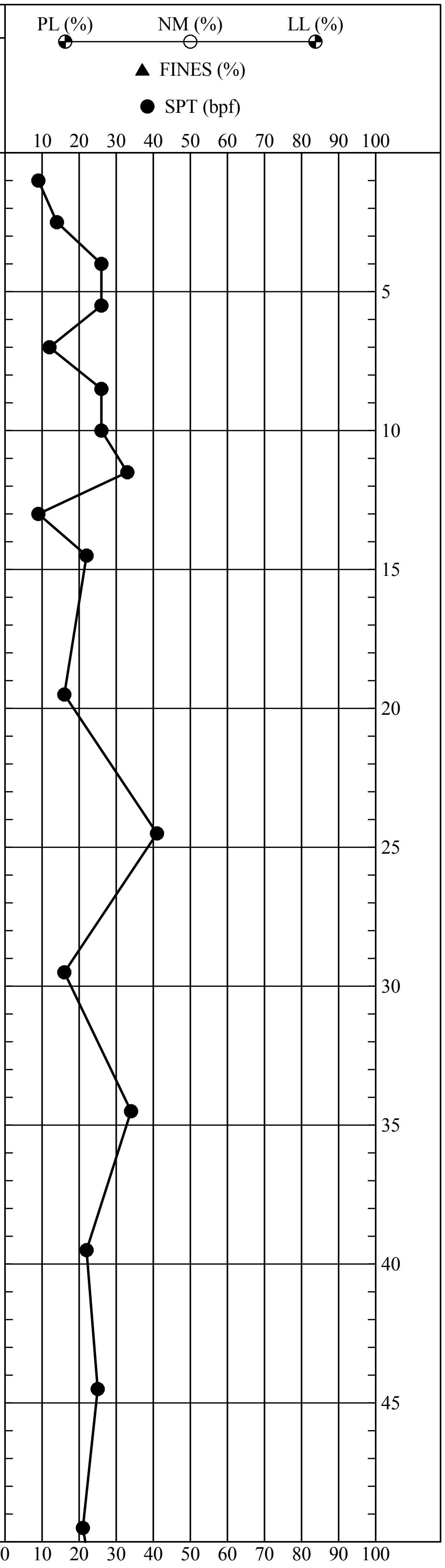
BORING NO.: B-1011
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 1, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)
0	Top of Barnwell Formation at 0'		219
	SAND WITH SILT (SP-SM); red, loose		
	Same as above, red, firm, fine to medium grained		
	Same as above, very firm		
5	SANDY SILT (ML); mottled red and yellow, very stiff, with traces of gray CLAY		214
	Same as above, stiff		
	Pile driving analizer placed on hammer during Sample #5		
	SAND WITH SILT (SP-SM); brown, very firm		
10	Same as above, brown, gray, very firm, with 2" seam of mottled red and gray SILTY SAND at 10'		209
	SAND WITH SILT (SP-SM); stratified light brown, medium brown, light gray and medium gray, fine grained, medium dense		
	Pile driving analizer placed on hammer during Sample #8		
15	SANDY SILT (ML) - mottled red and brown, stiff		204
	SAND WITH SILT (SP-SM); mottled red and light purple, medium loose		
	SANDY SILT (ML); mottled red, yellow and gray, very stiff		
	SAND WITH SILT (SP-SM); brown, firm		
	Same as above, mottled red and brown, firm		
20			199
	Same as above, medium brown, very firm		
25	Same as above, mottled red and purple, very firm, fine to medium grained		194
	Same as above, red, medium and light brown, firm		
30	Pile driving analizer placed on hammer during Sample #13		189
	Same as above, laminated yellow, tan and white, dense, fine to medium grained		
35	Pile driving analizer placed on hammer during Sample #14		184
	Same as above, light brown, very firm, medium grained		
40	Pile driving analizer placed on hammer during Sample #15		179
	SAND (SP); light brown, medium to coarse grained, very firm		
45			174
50			169

SAMPLES

IDENT	TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"
SPT-1	☒	4-4-5 (N = 9)
SPT-2	☒	5-7-7 (N = 14)
SPT-3	☒	11-13-13 (N = 26)
SPT-4	☒	12-12-14 (N = 26)
SPT-5	☒	5-6-6 (N = 12)
SPT-6	☒	7-12-14 (N = 26)
SPT-7	☒	12-13-13 (N = 26)
SPT-8	☒	16-17-16 (N = 33)
SPT-9	☒	6-5-4 (N = 9)
SPT-10	☒	4-4-18 (N = 22)
SPT-11	☒	6-8-8 (N = 16)
SPT-12	☒	11-19-22 (N = 41)
SPT-13	☒	10-8-8 (N = 16)
SPT-14	☒	12-14-20 (N = 34)
SPT-15	☒	7-10-12 (N = 22)
SPT-16	☒	12-12-13 (N = 25)
SPT-17	☒	9-11-10



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 5976.08, E 8272.50 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 218.62

ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

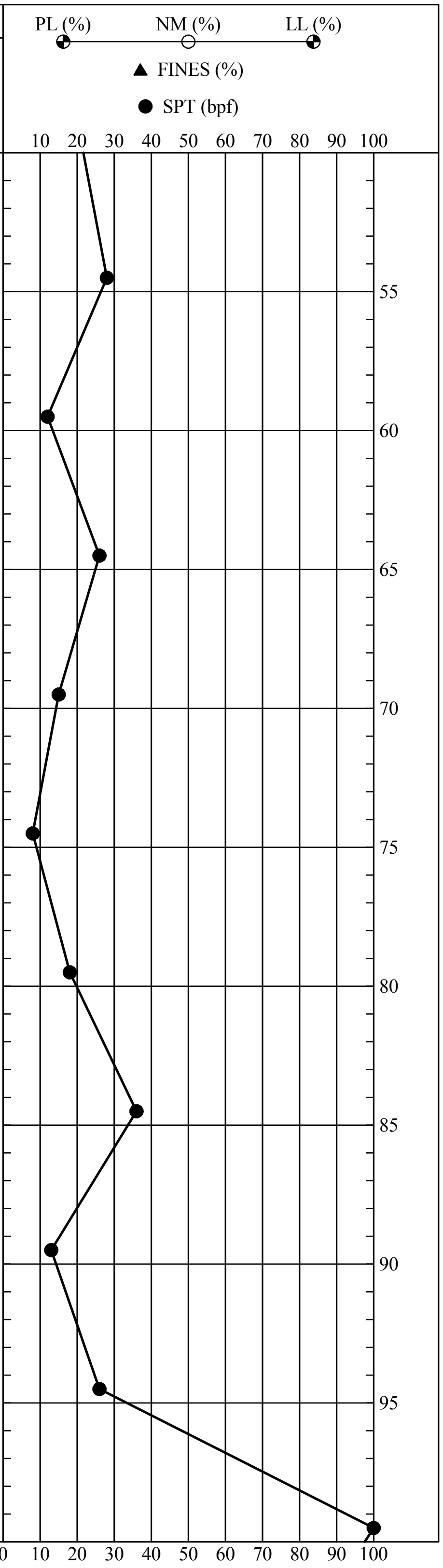
SOIL TEST BORING RECORD

BORING NO.: B-1013
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 7, 2005
PROJECT NO.: 6141-05-0227

PAGE 1 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT (1st 6" 2nd 6" 3rd 6")
50	SAND (SP); light brown, medium to coarse grained, very firm	169			(N = 21)
	SAND WITH SILT (SP-SM); light brown, medium to coarse grained, very firm		SPT-18	☒	10-12-16 (N = 28)
55		164			
	SAND WITH SILT (SP-SM); light and medium brown, firm, fine to medium grained		SPT-19	☒	7-6-6 (N = 12)
60		159			
	SAND (SP); brown, light brown, very firm, medium to coarse grained		SPT-20	☒	10-13-13 (N = 26)
65		154			
	SAND WITH SILT (SP-SM); light brown, medium to coarse grauned, firm, with traces of CLAY		SPT-21	☒	3-6-9 (N = 15)
70		149			
	CLAYEY SILT (ML); light brown, firm		SPT-22	☒	4-4-4 (N = 8)
75		144			
	SAND WITH SILT (SP-SM); light brown, fine to medium grained, firm		SPT-23	☒	9-7-11 (N = 18)
80		139			
	Same as above, dense		SPT-24	☒	11-17-19 (N = 36)
85		134			
	SANDY CLAY (CL-ML); mottled gray, medium brown, purple and green		SPT-25	☒	2-4-9 (N = 13)
90	SILTY SANDY CLAY (CL-ML); black with laminations of light and medium brown CLAY	129			
	SILTY SANDY CLAY (CL-ML); light, medium and dark brown				
	SILTY SANDY CLAY (CL-ML); light brown				
	SILTY CLAY (CL-ML); light grey with lenses of brown SILTY SAND		SPT-26	☒	7-11-15 (N = 26)
95		124			
	SILTY CLAY (CL-ML); light brown, fissured, very stiff				
	Top of Lisbon Formation (Blue Bluff Marl) at 96' SANDY CLAYEY SILT (ML); gray, fissured, hard		SPT-27	☒	50/2"
100		119			



SOIL TEST BORING VOGTLE-OCTOBER-2007.GPJ LAW_GIBB.GDT 11/12/07

DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 5976.08, E 8272.50 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL

ELEVATION (ft) = 218.62

ELEVATION DATUM = NAVD 88

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BEWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

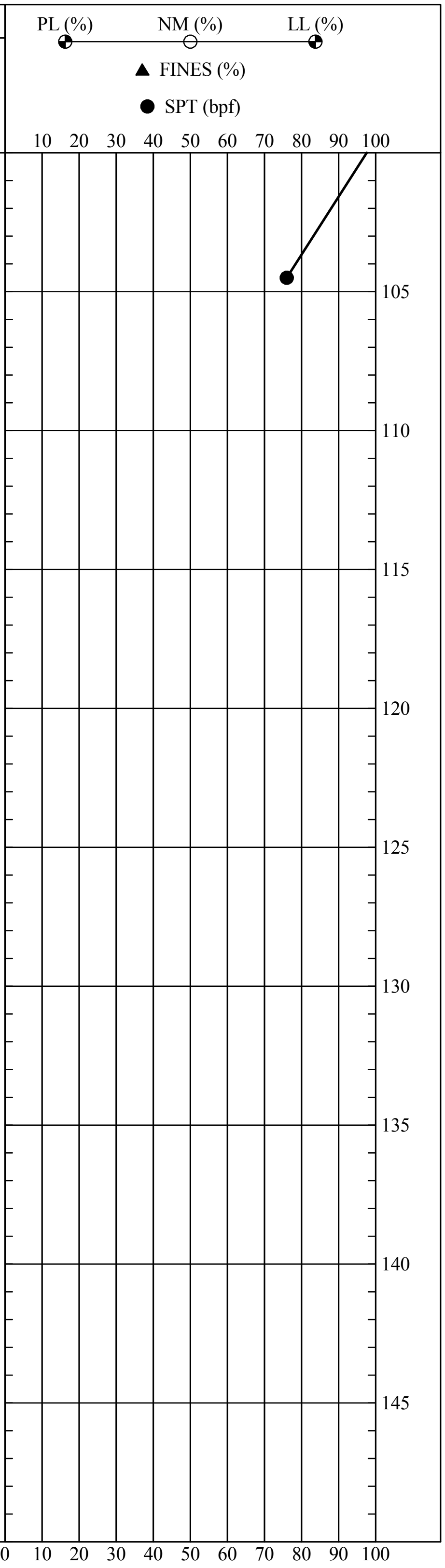
SOIL TEST BORING RECORD

BORING NO.: B-1013
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 7, 2005
PROJECT NO.: 6141-05-0227

PAGE 2 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	SAMPLES N-COUNT 1st 6" 2nd 6" 3rd 6"
100	SANDY CLAYEY SILT (ML-CL); gray, fissured, hard		119			
	Same as above, traces of shells			SPT-28	☒	15-33-43 (N = 76)
105	Boring Terminated at 105 feet on 9/8/05		114			
110			109			
115			104			
120			99			
125			94			
130			89			
135			84			
140			79			
145			74			
150			69			



DRILLER:	Robert Banks (MACTEC)
EQUIPMENT:	CME-55 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	4 inches
REMARKS:	Plant Grid: N 5976.08, E 8272.50 +HCL denotes a visible reaction with Hydrochloric Acid (HCL), -HCL denotes no visible reaction with HCL
	ELEVATION (ft) = 218.62
	ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: B-1013
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: September 7, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 3 **OF** 3

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
0	This boring was created for P-S suspension logging. No material sampling was performed. Attempted to mud roatary to 60 feet. Added 200 gallons of drilling fluid to fill hole for P-S suspension logging. Logged hole to a depth of 33 feet.		224				
5			219				5
10			214				10
15			209				15
20			204				20
25			199				25
30			194				30
35			189				35
40			184				40
45			179				45
50	Loss of circulation.		174				

0 10 20 30 40 50 60 70 80 90 100

DRILLER:	Jimmy Oglesby (MACTEC)
EQUIPMENT:	CME-75 (Auto-Hammer)
METHOD:	Rotary Wash with Mud
HOLE DIA.:	6 inches
REMARKS:	Plant Grid: N 7989.75, E 8179.26 Boring is offset 7 feet SSE from C-1005.

ELEVATION (ft) = 223.66

ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: C-1005A
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: October 6, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 1 **OF** 2

MACTEC

DEPTH (ft)	SOIL CLASSIFICATION AND REMARKS SEE KEY SHEET FOR EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED BELOW.	LEGEND	ELEV (ft)	SAMPLES IDENT	SAMPLES TYPE	N-COUNT 1st 6" 2nd 6" 3rd 6"	PL (%) NM (%) LL (%) ▲ FINES (%) ● SPT (bpf) 10 20 30 40 50 60 70 80 90 100
50			174				
55			169				55
60	Resumed drilling to 90 feet.		164				60
65	Loss of circulation. Added bentonite pellets and continued drilling but did not regain circulation. Added 300 gallons of drilling fluid between 63.5 and 81 feet.		159				65
70			154				70
75			149				75
80			144				80
	Driller noted large shells. Added 100 gallons of drilling fluid between 81 and 90 feet. Probable top of Blue Bluff Marle						
85			139				85
90	Added100 gallons of drilling fluid at 90 feet. P-S suspension logging was not performed due to presence of cuttings in bore hole and the large shell bed at 81 feet. Boring terminated at 90 feet on 10/6/05.		134				90
95			129				95
100			124				0 10 20 30 40 50 60 70 80 90 100

DRILLER: Jimmy Oglesby (MACTEC)
EQUIPMENT: CME-75 (Auto-Hammer)
METHOD: Rotary Wash with Mud
HOLE DIA.: 6 inches
REMARKS: Plant Grid: N 7989.75, E 8179.26
Boring is offset 7 feet SSE from C-1005.

ELEVATION (ft) = 223.66
ELEVATION DATUM = NAVD 88

SOIL TEST BORING RECORD

BORING NO.: C-1005A
PROJECT: ALWR - ESP
LOCATION: PLANT VOGTLE, BURKE COUNTY, GA
DRILLED: October 6, 2005
PROJECT NO.: 6141-05-0227 **PAGE** 2 **OF** 2

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APPENDIX B

CPT TESTING REPORT FROM
APPLIED RESEARCH SERVICES

CONE PENETRATION TESTING SUBSURFACE INVESTIGATION FOR SOUTHERN NUCLEAR OPERATING COMPANY, INC.

ADVANCED LIGHT WATER REACTOR EARLY SITE PERMIT

ALVIN W. VOGTLE NUCLEAR PLANT
WAYNESBORO, GEORGIA

Prepared for:

MACTEC Engineering and Consulting, Inc.
396 Plasters Avenue
Atlanta, Georgia

Prepared by:

Applied Research Associates, Inc.
New England Division
415 Waterman Road
South Royalton, Vermont 05068

ARA Report No. 17087

February 10, 2006

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SECTION 1

CONE PENETROMETER TESTING SUBSURFACE INVESTIGATION FOR ALVIN W. VOGTLE NUCLEAR PLANT WAYNESBORO, GEORGIA

SOUTHERN NUCLEAR OPERATING COMPANY, INC.
ADVANCED LIGHT WATER REACTOR EARLY SITE PERMIT INVESTIGATION

INTRODUCTION

Applied Research Associates, Inc. (ARA) under contract to MACTEC Engineering and Consulting, Inc., conducted Electric Cone Penetration Tests with seismic measurements (S-CPT) in support of the subsurface investigation for Southern Nuclear Operating Company, Inc.'s Alvin W. Vogtle Nuclear Plant's Advanced Light Water Reactors Early Site Permit, in Waynesboro, Georgia. This report documents ARA's site investigation efforts, test techniques, and analysis of the data for fieldwork conducted September 1 through September 8, 2005. Presented in this report are the field-testing methods, data analysis techniques, and hardcopies of the test results.

TEST LOCATIONS

Twelve cone penetrometer test soundings were conducted at the site**.** Two additional soundings (C-1001A and C-1009A) from were offset and conducted due to shallow refusal at (C-1001 and C-1009). All the soundings were advanced from ground surface. Tip stress, sleeve stress, and penetration pore pressure were measured in all the CPTs. Seismic shear wave measurements were obtained at five-foot intervals at three locations. Compression wave measurements were not obtained as part of this investigation.

Table 1 lists the penetrations and relevant information about each location. All locations were grouted upon retraction of the rod string using a standard tremie grout method. The surveyed coordinates and elevations for all CPTs are listed on Figure 1. MACTEC Engineering and Consulting, Inc. provided the site map and survey data.

REPORT OUTLINE

This report is organized into 4 Sections and 3 Appendices. Section 2 discusses the CPT equipment, field procedures, and daily calibrations**.** Section 3 describes the methods used to interpret the CPT results. Section 4 lists references. Appendix A presents the piezo-cone data. Seismic test wave histories and velocities are located in Appendix B. Appendix C contains pore pressure dissipation plots and a summary of these data, along with estimated values of constrained modulus, coefficient of lateral consolidation, and coefficient of lateral permeability.

Table 1. Summary of CPT testing at the Alvin W. Vogtle Nuclear Plants Subsurface Investigation

Project : MACTEC Engineering & Consulting, Inc.
Southern Nuclear Operating Company, inc.
Advanced Light Water Reactor Early Site Permit

Probe Diameter: 1.75 (in)

Test ID	Surface Elevation (ft)	Predrilled Depth	Depth of CPT (ft)	Seismic CPT	Water Table Depth (ft)	Water Table Elev (ft)	Test Depth (ft)	Test Elev (ft)	Static Pressure (psi)	Maximum Pressure (psi)	50 % Pressure (psi)	Tip Stress (tsf)	Tip Stress (psi)	Alpha	Constrained Modulus (psi)	Time 50% (min)	Lateral Consolidation (in2/s)	Lateral Consolidation (cm2/sec)	Lateral Permeability (cm/s)
C-1001	248.57	0.0	13.0	No	NA	NA	NA	NA											
C-1001A	248.57	0.0	116.7	No	NA	NA	NA	NA											
C-1002	222.13	0.0	78.5	No	NA	NA	NA	NA											
C-1003	219.80	0.0	80.0	Yes	44.6	175.20	68.31	151.5	10.3	10.45	10.4	487.3	6768.1	1.0	6768.1	0.09	7.80E-01	5.03E+00	1.06E-05
C-1003	219.80	0.0	80.0	Yes	51.8	168.00	79.07	140.7	11.8	13.68	12.7	198.1	2751.4	1.0	2751.4	1.0	6.95E-02	4.48E-01	2.32E-06
C-1004	220.82	0.0	77.0	No	NA	NA	66.25	154.6	NA	317.44	158.72	43.3	601.4	1.0	601.39	10.61	6.61E-03	4.27E-02	1.01E-06
C-1005	223.81	0.0	82.0	Yes	34.01	189.80	56.08	167.7	9.6	86.59	48.1	12.0	166.7	1.0	166.67	4.44	1.58E-02	1.02E-01	8.70E-06
C-1005	223.81	0.0	82.0	Yes	47.84	175.97	73.14	150.7	11.0	75.19	43.1	12.5	173.6	1.0	173.6	8.37	8.38E-03	5.41E-02	4.43E-06
C-1005	223.81	0.0	82.0	Yes	NA	NA	81.97	141.8											
C-1006	222.80	0.0	74.0	No	NA	NA	NA	NA											
C-1007	222.81	0.0	81.7	No	NA	NA	NA	NA											
C-1008	221.30	0.0	76.0	No	NA	NA	NA	NA											
C-1009	218.93	0.0	6.0	Yes	NA	NA	NA	NA											
C-1009A	218.93	0.0	99.0	Yes	49.97	168.96	60.12	158.8	4.4	4.45	4.4	128.6	1786.1		1786.1				
C-1009A	218.93	0.0	99.0	Yes	49.53	169.40	77.04	141.9	11.9	11.96	11.9	292.7	4065.3		4065.28				
C-1009A	218.93	0.0	99.0	Yes	NA	NA	90.07	128.9	39.0	283.76	141.88	68.2	1.89	1.0	947.22	16.28	4.31E-03	2.78E-02	4.17E-07
C-1009A	218.93	0.0	99.0	Yes	44.9	15.97	99.07	119.9	23.5	710.47	367.0	140.3	1948.6	1.0	1948.61	2.31	3.04E-02	1.96E-01	1.43E-06
C-1010	219.06	0.0	96.0	No	NA	NA	NA	NA	0.0										

Note 1: Dissipation analysis conducted on profiles exhibiting classic dissipation profile only.
Note 2: Dissipation tests C-1005.82, C-1009A-60, and C-1009A-77 exhibit a dilating condition not appropriate for permeability estimate.

MACTEC Engineering and Consulting, Inc.
and
Bechtel Corporation, Inc.

September 1 - 8, 2005

Alvin W. Vogtle Nuclear Plant
Cone Penetrometer Testing (CPT) Geotechnical Investigation

Southern Nuclear Operating Company, Inc.
Waynesboro, Georgia

Test Identification	Type of Test	ARA Filename	Northing	Easting	Elevation	Final Depth
C-1001	PCPT	202S0503	8028.12	6355.96	248.57	13.00
C-1001A	PCPT	202S0504	NA	NA	NA	116.70
C-1002	PCPT	206S0501	7667.64	6574.64	222.13	78.50
C-1003	SCPT	207L0506	7669.31	7477.87	219.80	80.00
C-1004	PCPT	201S0501	7646.13	8361.84	220.82	77.00
C-1005	SCPT	208S0501	7995.26	8174.60	223.81	82.00
C-1006	PCPT	201S0504	8001.46	7261.58	222.80	74.00
C-1007	PCPT	202S0502	8270.62	8055.05	222.81	81.70
C-1008	PCPT	202S0501	8268.48	6930.89	221.30	76.00
C-1009	SCPT	207S0501	5979.62	6798.49	218.93	6.00
C-1009A	SCPT	207S0505	NA	NA	NA	99.00
C-1010	PCPT	208S0502	6008.34	7754.15	219.06	96.00

Note: PCPT: Peizo-Cone Penetrometer Test; SCPT: Seismic Cone Penetrometer Test;
CPT locations C-1001A and C-1009A were offset by approximately 5-10 feet due to refusal. MACTEC to provide elevations and cooridinates for these soundings.

Figure 1. CPT Locations Table

SECTION 2

TESTING EQUIPMENT AND PROCEDURES

INTRODUCTION

The electric cone penetrometer test (CPT) was originally developed for use in soft soil. Over the years, cone and push system designs have evolved to the point where they can now be used in strong cemented soils and even soft rock. ARA's penetrometer consists of an instrumented probe that is forced into the ground using a hydraulic load frame mounted on a heavy truck with the weight of the truck providing the necessary reaction mass. The probe has a conical tip and a friction sleeve that independently measure vertical resistance beneath the tip as well as frictional resistance on the side of the probe as a function of depth. A schematic view of ARA's penetrometer probe is shown in Figure 2. A pressure transducer in the cone is used to measure the pore water pressure as the probe is pushed into the ground (P-CPT). This probe also includes three geophones aligned along the X, Y, and Z-axis for measuring shear and compressional waves velocities.

PIEZO-ELECTRIC CONE PENETROMETER EQUIPMENT AND TEST

The cone penetrometer tests were conducted using the ARA penetrometer truck (Mack 1). The penetrometer equipment is mounted inside a van body attached to a ten-wheel truck chassis. Ballast in the form of weights is added to the truck to achieve an overall push capacity of 60,000 lbs. Penetration force is supplied by a pair of large hydraulic cylinders bolted to the truck frame. If the push cylinders measure 15,000 to 20,000 pounds per square inch (psi), ARA’s crew chief may declare a sounding refusal. Multiple attempts to penetrate the identified stratigraphy will be conducted prior to abandoning the sounding within the subject area.

A 15-cm^2 penetrometer probe (which has 1.75-inch diameter, 60° conical tip, and a 1.75-inch diameter by 6.5-inch long friction sleeve) was used on this project. This probe size is in conformance with ASTM D 5778 (Ref. 1). The shoulder between the base of the tip and the porous filter, shown in Figure 2, is 0.08 inch long. The penetrometer is advanced vertically into the soil at a constant rate of 48 inches/minute (2 cm/second), although this rate must sometimes be reduced as hard layers are encountered. The electric cone penetrometer test is conducted in accordance with ASTM D 5778 (Ref. 1).

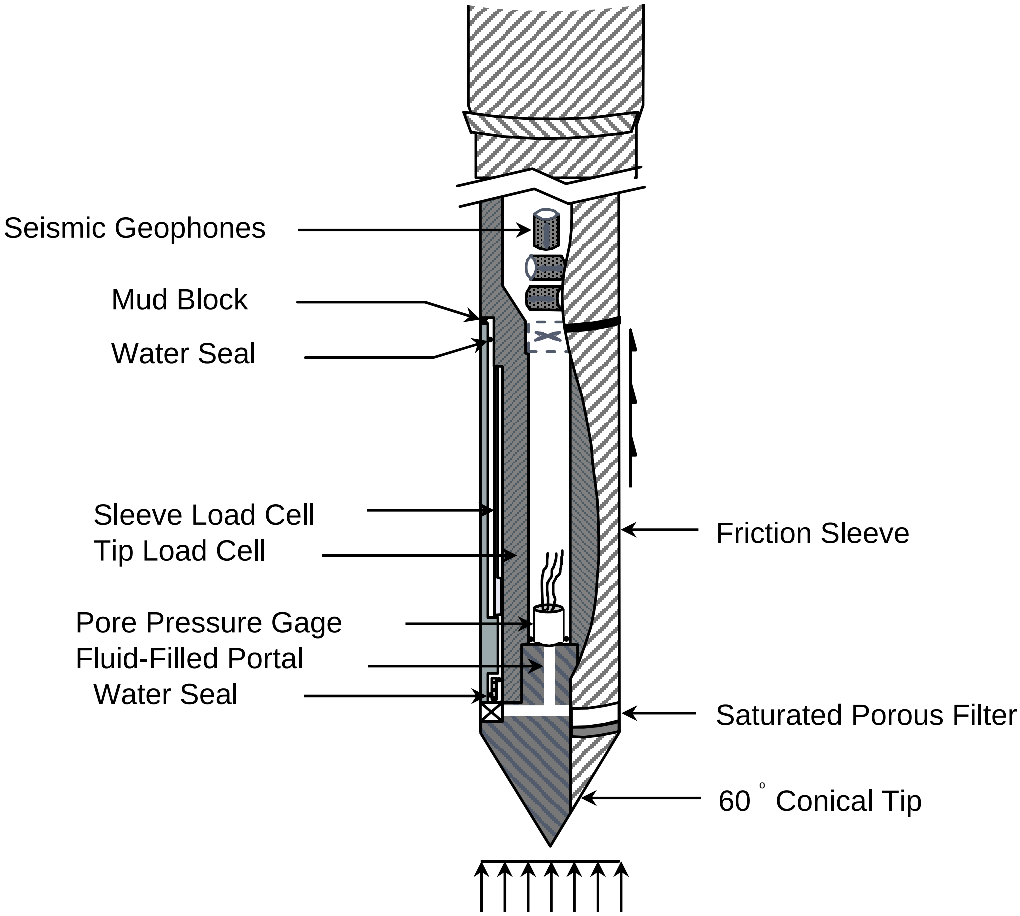


Figure 2. Schematic of ARA's Peizo-Electric Cone Penetrometer

Inside the probe, two load cells independently measure the vertical resistance against the conical tip and the side friction along the sleeve. Each load cell is a cylinder of uniform cross section instrumented with four strain gages in a full-bridge circuit. The forces are sensed by the load cells and the data are transmitted from the probe assembly via a cable running through the push rods. The analog data are digitized, recorded, and plotted by computer in the penetrometer truck. A set of data is normally recorded each second, for a minimum resolution of about one data point every 0.8 inch of cone advance. The depth of penetration is measured using a string potentiometer mounted on the push frame.

Electronic data acquisition equipment for the cone penetrometer consists of a computer with a graphics monitor and eight signal conditioners. Analog signals are transmitted from the probe to the signal conditioners where the CPT data are amplified and filtered at 1 Hz. Once amplified, the analog signals are transmitted to a high-speed analog-to-digital converter board, where the signals are digitized, usually at the rate of one sample per second for the penetration data. The digital data are then read into memory and written to the internal hard disk for future processing. Upon completion of the test, the penetration data are plotted. The digital data are brought to ARA's New England Division in South Royalton, Vermont, for analysis and preparation of report plots.

Saturation of the Piezo-Cone

Penetration pore pressure is measured with a pressure transducer located behind the tip in the lower end of the probe. Water pressures in the soil are sensed through a 250 micro-inch porous polyethylene filter that is 0.25-inch high and 0.202-inch thick. The pressure transducer is connected to the porous filter through a fluid-filled pressure port as shown in Figure 2.

In order for the pressure transducer to respond rapidly and correctly to changing pore pressures during the penetration, the filter and pressure port must be saturated with silicone oil upon assembly of the probe. A vacuum pump is used to de-air the silicone oil before use and also to saturate the porous filters with oil. The probe is assembled with the pressure transducer facing upwards and the cavity above the pressure transducer is filled with de-aired oil. A previously saturated filter is then placed on a tip and oil is poured over the threads. When the cone tip is screwed into place, excess oil is ejected through the pressure port and filter, thereby forcing out any trapped air. The high viscosity of the silicone oil, coupled with the small pore space in the filter, prevents the loss of saturation as the cone is pushed through dry soils. Saturation of the cone is verified with a calibration check at the completion of the penetration. Extensive field experience has proven the reliability of this technique.

Field Calibrations

Many factors can effectively change the calibration factors used to convert the raw instrument readouts, measured in volts, to units of force or pressure. As a quality control measure, as well as a check for instrument damage, the load cells and the pressure transducer are routinely calibrated in the field. Calibrations are performed at the start of each day when the probe is ready to insert into the ground so that any factor affecting any component of the instrumentation system will be included and detected during the calibration.

The tip and sleeve load cells are calibrated with the conical tip and friction sleeve in place on the probe. For each calibration, the probe is placed in the push frame and loaded onto a precision reference load cell. The reference load cell is periodically calibrated in ARA's laboratory against instruments traceable to NIST standards. To calibrate the pore pressure transducer, the saturated probe is inserted into a pressure chamber with air pressure supplied by the compressor on the truck. The reference transducer in the pressure chamber is also periodically calibrated against an NIST-traceable instrument in ARA's laboratory. Additionally, the linear displacement transducer used to measure the depth of penetration is periodically checked against a tape measure. All records of device and load cell calibrations are maintained at ARA’s New England Division.

Each instrument is calibrated using a specially developed computer code that displays the output from the reference device and the probe instrument in graphical form. During the calibration procedure, the operator checks for linearity and repeatability in the instrument output. At the completion of each calibration, this code computes the calibration factors using a linear regression algorithm. At a minimum, each probe instrument is calibrated at the beginning of each day of field-testing. Furthermore, the pressure transducer is recalibrated each time the porous filter is changed and the cone re-saturated. Calibrations are also performed to verify the operation of any instrument if any damage is suspected.

Penetration Data Format

Figure 3 presents a typical CPT profile from the A.W. Vogtle Nuclear Plant site investigation. This plot presents friction sleeve stress, tip stress, friction ratio, and penetration pore pressure. Additionally, presented on the second page of the plot profile is probe inclination, soil behavior type and stratigraphy based on corrected friction ratio. As shown in Figure 2, the piezo-cone probe senses the pore pressure immediately behind the tip. Currently, there is no accepted standard for the location of the pore pressure sensing element. ARA chose to locate this sensing element behind the tip to protect the filter from the direct thrust of the penetrometer and so that the measured pore pressure can be used to correct the tip resistance data as recommended in Reference 2. The magnitude of the penetration pore pressure is a function of the soil compressibility and, most importantly, permeability. In freely draining soil layers, the measured pore pressures will be very close to the hydrostatic pressure computed from the elevation of the water table. When low permeability soil layers are encountered, excess pore pressures generated by the penetration process cannot dissipate rapidly and this results in measured pore pressures that are significantly higher than the hydrostatic pressures. Whenever the penetrometer is stopped to add another section of push pipe or when a pore pressure dissipation test is run, the excess pore pressure may begin to dissipate. When the penetration is resumed, the pore pressure quickly rises to the level measured before the penetrometer was stopped. This process causes some of the spikes that appear in the penetration pore pressure data.

Pore Pressure Correction of Tip Stress

Cone penetrometers, by necessity, must have a joint between the tip and sleeve. Pore pressure acting behind the tip decreases the total tip resistance that would be measured if the penetrometer was without joints. The influence of pore pressure in these joints is compensated for by using the net area concept (Ref. 2).

The corrected tip resistance is given by:

$$q_t = q_c + u\,[1 - \mathrm{A_n}/\ \mathrm{A_T}] \qquad \textbf{(2.1)}$$

where:
q_t = corrected tip resistance (psi)
q_c = measured tip resistance (psi)
u = penetration pore pressure measured behind the tip (psi)

$\mathrm{A_n}$ = net area behind the tip not subjected to the pore pressure (1.897 in^2)
$\mathrm{A_T}$ = projected area of the tip (2.351 in^2).

Hence, for the ARA cone design, the tip resistance is corrected as:

$$q_t = q_c + u(0.1931) \qquad \textbf{(2.2)}$$

Laboratory calibrations have verified Equation 2.2 for ARA's piezo-cone design.

A joint also exists behind the top of the friction sleeve (see Figure 2). However, since the sleeve is designed to have the same cross sectional area on both ends, the pore pressures acting on the sleeve cancel out. Laboratory tests have verified that the sleeve is not subjected to unequal end area effects. Thus, no correction for pore pressure is needed for the friction sleeve data.

The net effect of applying the pore pressure correction is to increase the tip resistance. Generally, this correction is only significant when the measured tip resistance is very low.

The following figure graphically displays versus elevation a typical CPT sounding from the Alvin W. Vogtle Nuclear Plant limited investigation. Sleeve friction, (Sleeve Stress) is presented inversely of corrected tip resistance (Tip Stress COR) column. The friction ratio is defined as the ratio between sleeve friction and cone resistance (Ratio COR). The measured insitu pore pressures are displayed adjacently. The continuation of the Figure 3 depicts the CPT probes north-south inclination (X inclination) and east-west (Y inclination) as it is advanced. The following columns are Soil Behavior Type (SBT) based on Normalized Friction Ratio Classification Chart (Class. Fr, (Robertson 1990)) and the correlating stratigraphy are depicted.

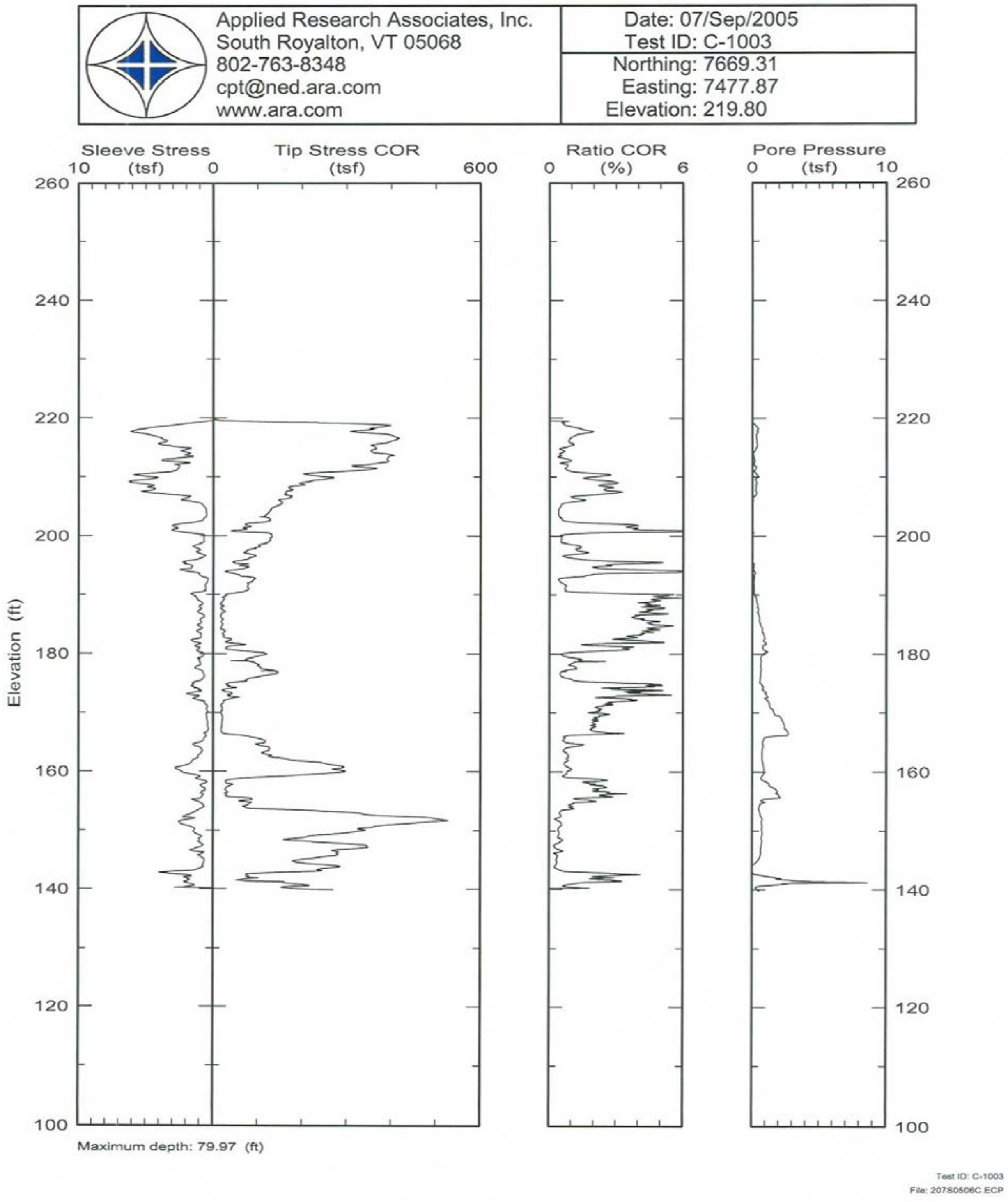
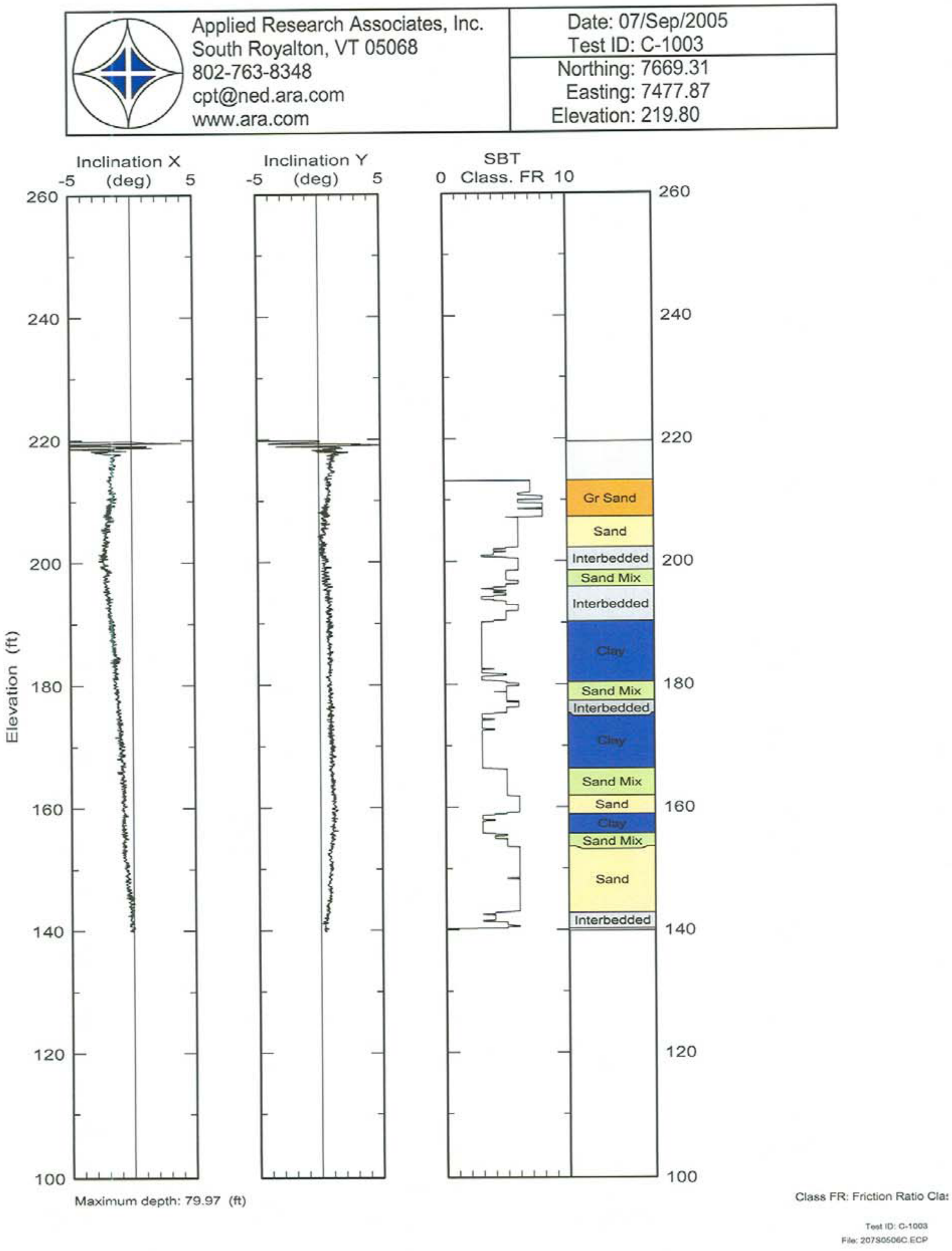


Figure 3. Typical CPT Profile from the A. W. Vogtle Site



Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 07/Sep/2005
Test ID: C-1003
Northing: 7669.31
Easting: 7477.87
Elevation: 219.80

Maximum depth: 79.97 (ft)

Class FR: Friction Ratio Cla

Test ID: C-1003
File: 207S0506C.ECP

Figure 3. Typical CPT Profile from the A. W. Vogtle Site (concluded)

Numerical Editing of the Penetration Data

Any time that the cone penetrometer is stopped or pulled back during a test, misleading data can result. For instance, when the probe is stopped to add the next push rod section or when a pore pressure dissipation test is run, the excess pore pressures will dissipate towards the hydrostatic pore pressure. When the penetration is resumed, the pore pressure rises very quickly to the pressures experienced prior to the pause in the test. In addition, to penetrate stronger layers, the probe is sometimes pulled back and cycled up and down at intervals in deep holes to reduce soil friction on the push tubes. This results in erroneous tip stress data when the cone is advanced in the previously penetrated hole.

To eliminate this misleading data from the penetration profile, the data are numerically edited before plotting or use in further analysis. Each time the penetrometer stops or backs up, as apparent from the depth data, the penetration data are not plotted. Plotting of successive data is resumed only after the tip is fully re-engaged in the soil by one tip length of new penetration. In addition, each time the probe stops, the previous 0.5 inch of penetration data is filtered out. This filter is required to remove data that were recorded while the operator was in the process of stopping the probe. This algorithm also eliminates any data acquired at the ground surface before the tip has been completely inserted into the ground. The sleeve data are similarly treated and this results in the first data point not occurring at the ground surface. These procedures ensure that all of the penetration data that are plotted and used for analysis were acquired with the probe advancing fully into undisturbed soil. All raw measurements are subjected to this procedure. An undefined value is represented by (-99) in data columns.

SEISMIC CONE PENETROMETER EQUIPMENT AND TEST

The seismic cone penetrometer test was developed in the early 1980s and is gaining rapid acceptance in the geotechnical community. As with the conventional electric cone penetrometer test, initial development work was concentrated in weak materials. ARA's seismic cone equipment and field procedures were developed specifically for both weak soils and strong, dry, cemented soils. The seismic cone penetrometer test utilizes three geophones (Geospace Model GS-14-L9 velocity gages) mounted inside the penetrometer probe to detect the arrival at depth of seismic waves generated on the surface. Two horizontal transducers monitor shear wave (S-wave) arrivals from which the shear wave velocity can be determined. A third geophone, mounted vertically, is used to measure the compression wave (P-wave) arrivals and to subsequently derive the compression wave velocity.

In the Seismic Cone Penetrometer Test (S-CPT), the cone is stopped at prescribed depth intervals, and S- and P-waves are generated on the ground surface near the push tubes. Both average downhole velocities and velocities between the depth intervals can be computed from the arrival time or time of peak data. High-energy shear waves are generated by an automated shear wave source in the front pad of the CPT rig (Figure 4). This system consists of a double-acting hydraulic cylinder used to horizontally move a large hammer. The hammer impacts either end of the front lifting pad of the penetrometer truck and induces a horizontal shear wave. By striking the pad on either end, polarized shear waves can be generated. This pad is 1 ft wide and about 8 ft long and oriented parallel to the axles of the truck. The point of impact of the shear hammers is located 36 inches

Figure 4. High Energy Shear Wave Hammer

horizontally from the penetrometer push rod. Typical seismic traces for this investigation are shown in Figure 5, where time of first peak shear wave motions are indicated.

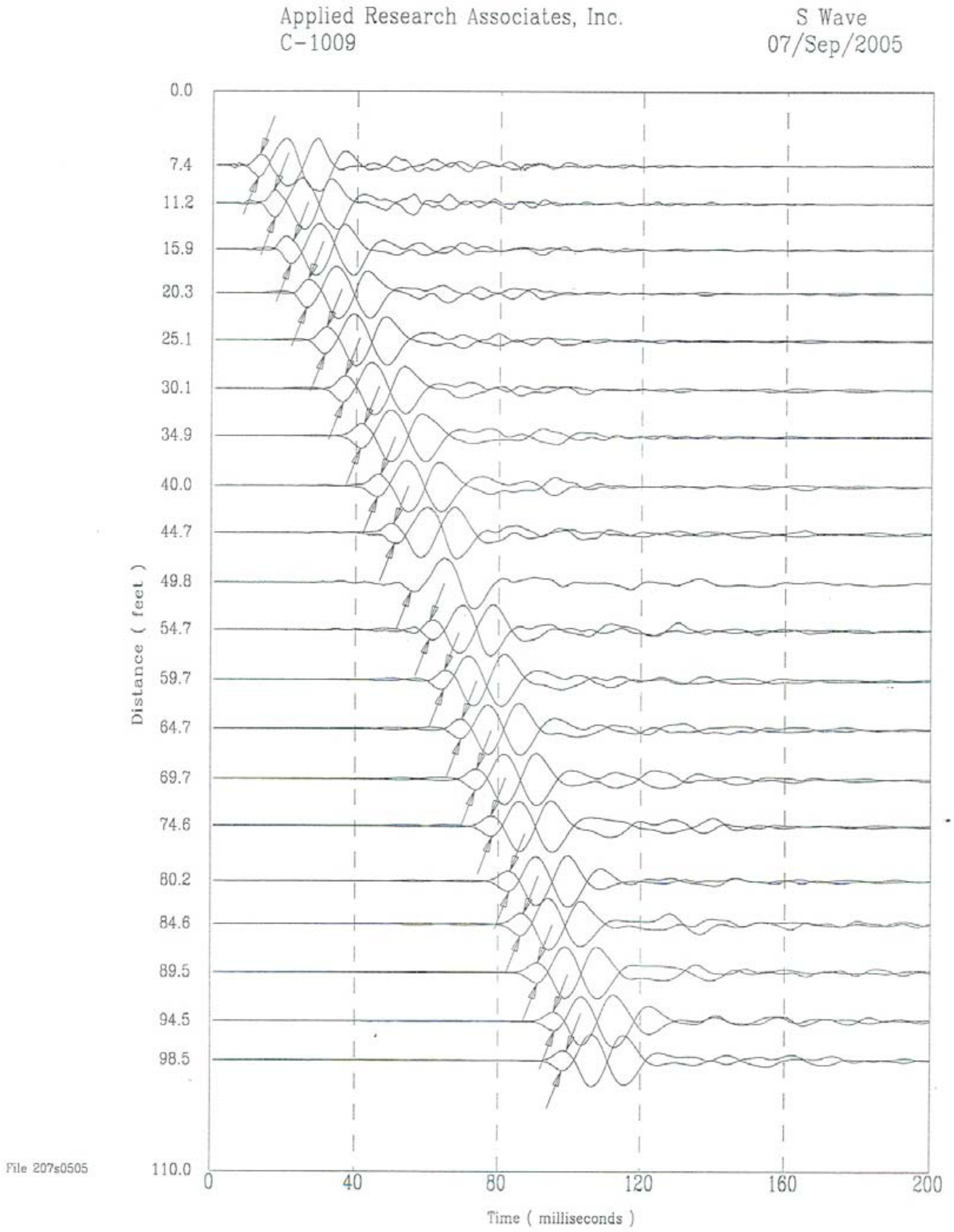


Figure 5. Typical Shear Wave Traces

The first major shear wave is used to select the shear time of peak as denoted by the arrows. The use of polarized shear waves clarifies this time of peak. Compression wave traces and/or analysis were not part of this investigation.

As discussed in Section 2, the seismic cone penetrometer utilizes two shear wave geophones and one compression wave geophone. When a seismic shear wave is generated at the surface it is recorded by both horizontal geophones. The geophone positioned in the most optimal orientation to record the cleanest seismic wave is selected by the operator and written to the seismic data file. Often times, no one trace stands out as being optimal, an occurrence that may be caused by geologic conditions or testing conditions (i.e., geophone orientation). When this occurs, the operator selects the seismic time history he feels is most optimal.

Prior to reporting, all seismic time histories are plotted, as they appear in Appendix B, and reviewed. When anomalous seismic waves are identified, and it is obvious the trace is not consistent with other traces from the same sounding, it is removed from the plot so as not to affect data analysis. Consequently, some seismic wave time history plots will have gaps where seismic waves were removed.

PORE PRESSURE DISSIPATION RESULTS

At selected depths, penetration of the penetrometer is stopped and the dissipation of excess pore pressure is observed. Pore pressures, as sensed by the pressure transducer, are recorded at regular time intervals (typically 1 second, but the sample rate can be adjusted for local site conditions) and plotted on the graphics monitor. Dissipation tests are usually run until at least 50 percent of the excess pore pressure has dissipated. This length of time, $t_{50,}$ can be used to estimate the lateral coefficient of consolidation and permeability in the given soil layer. Depending on site conditions, t_{50} can range from a few minutes to several hours. These tests are sometimes run to complete dissipation to measure the hydrostatic pore pressure.

During the dissipation test, the penetrometer is stationary with no downward force applied by the penetrometer truck.

A classic dissipation profile in a clay soil is shown in Figure 6. Total pore pressure is presented on a semi-log plot versus time, and the value of P_n at the top of Figure 6 is the average of the last ten pore pressure measurements. The classic dissipation curve will show a dissipation rate that decreases with time. If the dissipation test is allowed to run long enough, P_n will be equal to the static pore pressure. This value can also be determined from the water table elevation at some sites. Knowing the static pore pressure, u_o, as well as the peak pressure observed during the test, u_p, the pore pressure at 50 percent of dissipation, u_{50}, can be determined. Time to 50% dissipation, t_{50}, can then be read directly from the dissipation profile.

Some of the penetration profiles from the work at the A. W Vogtle Nuclear Plant site exhibit the classic shape as depicted in Figure 6. At some locations, however, the dissipations start with a vacuum condition due to dilatation occurring during the penetration. From this condition the pore pressures increase as presented in Figure 7. This curve shape does not permit the traditional dissipation analysis algorithms used to determine hydraulic conductivity or depth of groundwater surface. Therefore, hydraulic conductivities for these dissipation tests are not included in the analysis table presented in Appendix C.

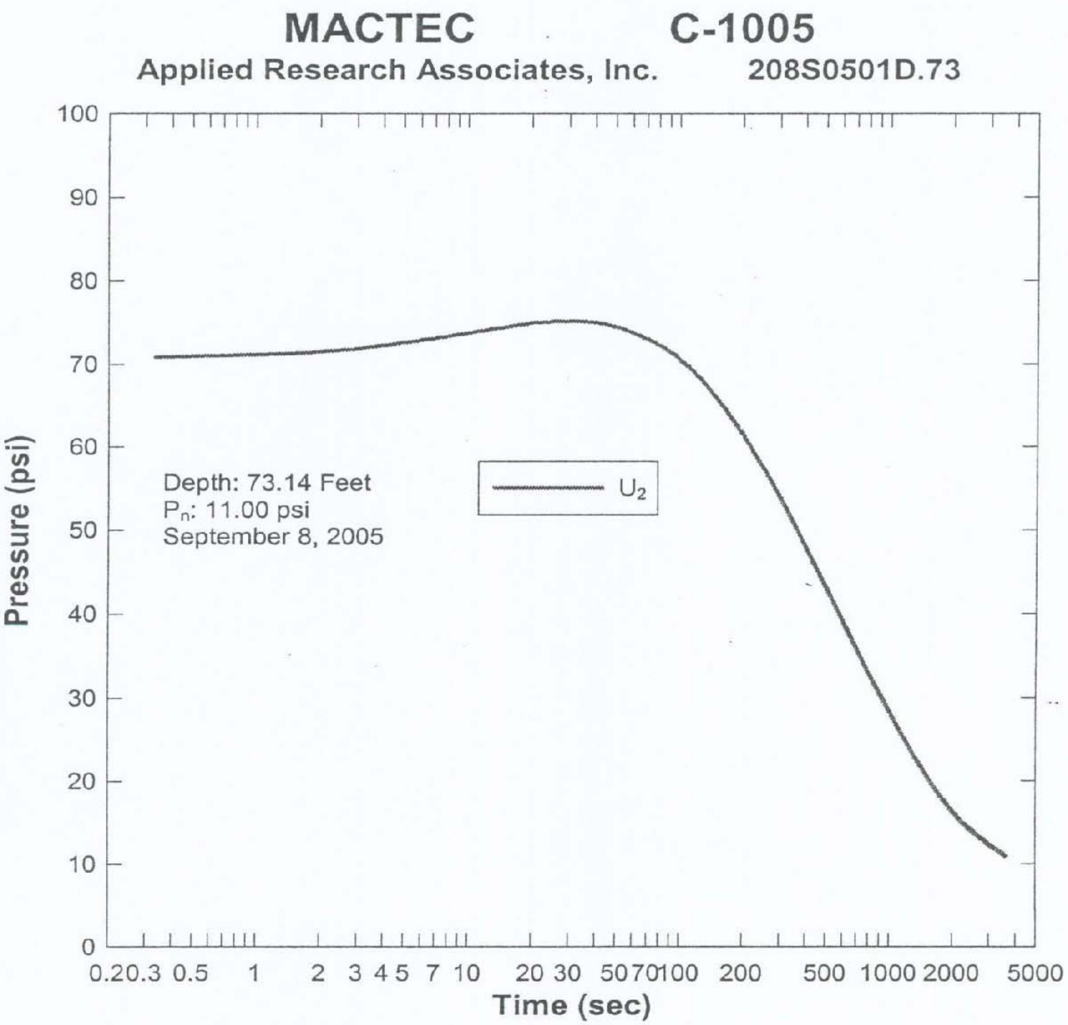


Figure 6. Classic Dissipation Profile from the A. W. Vogtle Plant Site

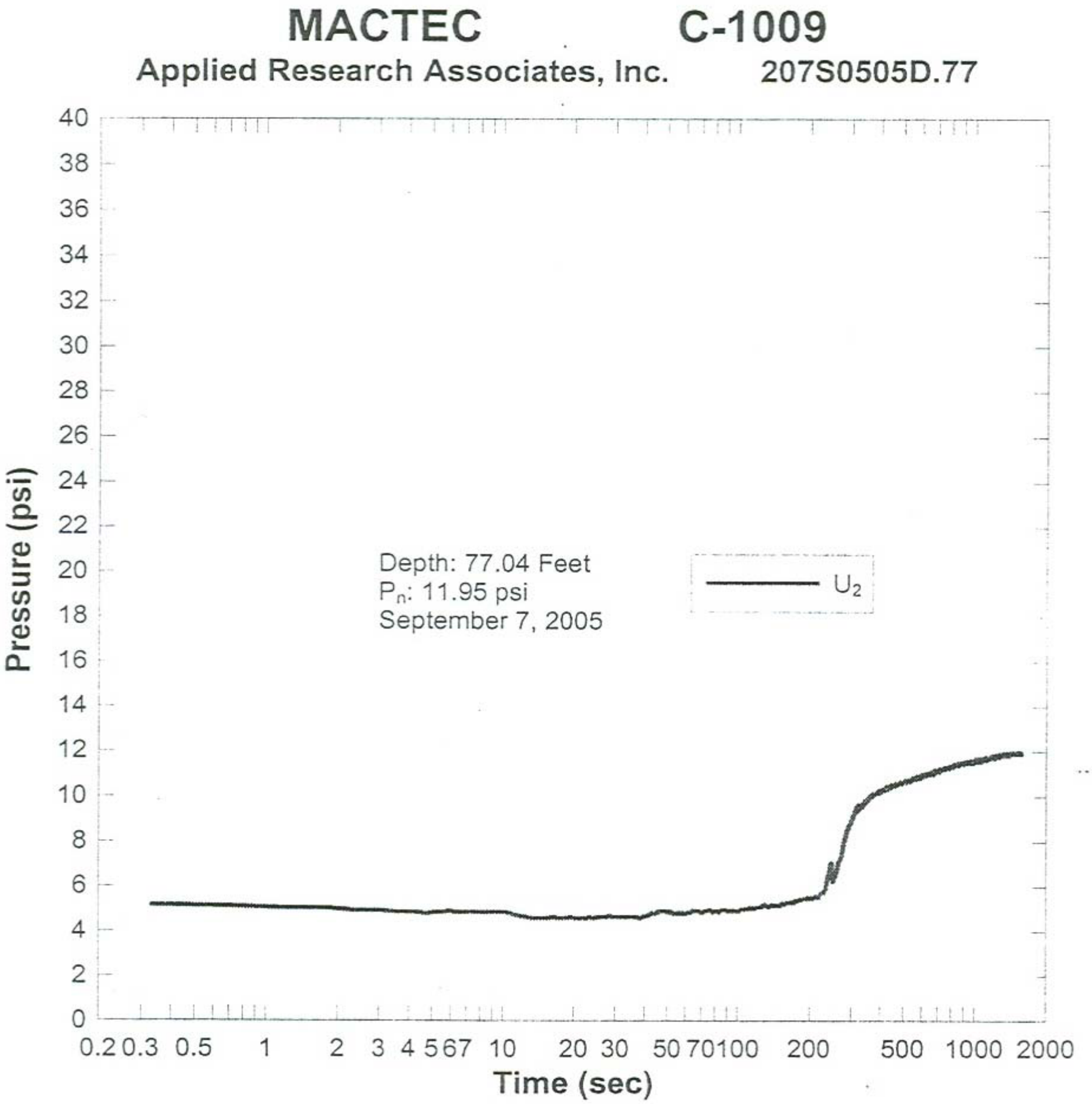


Figure 7. Dissipation Test Showing a Dilating Condition

SECTION 3

DATA ANALYSIS TECHNIQUES

OVERVIEW

Presented in this section is a description of analysis techniques used to determine engineering parameters. The methods used to determine the soil type information from the CPT are also discussed.

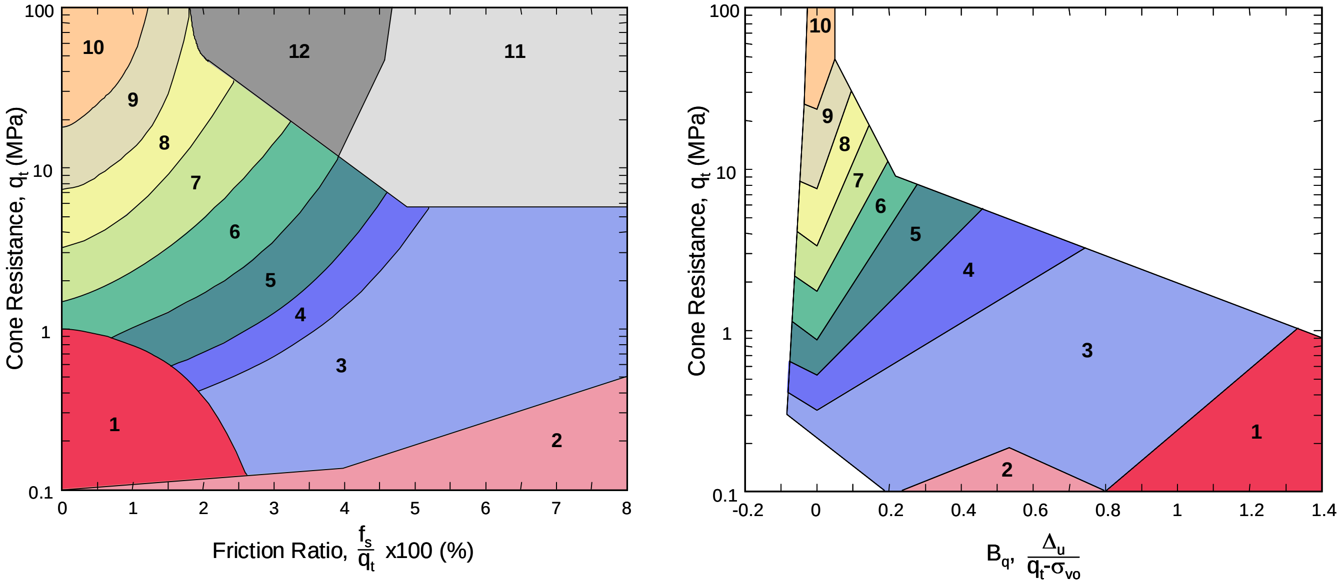
LOCATION OF THE SITE WATER TABLE

Generally, the static water table at a given site can be identified from the penetration pore pressures, since it will be equal to the hydrostatic pore pressure in freely draining soil layers. When no such layers are present, pore pressure dissipation tests can be performed to determine hydrostatic pressures. This information is used in the soil classification routines for the calculation of effective stress of the soil materials. Bechtel Corporation personnel supplied ARA with values for saturated unit weights for soil density ((pcf) per cubic foot)). The design dry density for the upper sands is 94 pcf, and the moisture content is 25%. This results in a saturated unit weight of 117.5 pcf. The values of the marl are 88 pcf and 35%, resulting in a saturated unit weight of 118.8 pcf.

SOIL BEHAVIOR TYPE

The tip resistance, friction ratio, and pore pressure values from CPT profiles can be used to determine a soil stratigraphy profile. To estimate soil behavior type, empirical charts were developed by Robertson and Campanella (Ref. 2) showing the relationship between tip resistance (q_t) versus friction ratio (f_s) and tip resistance (q_t) versus pore pressure ratio (B_q) Figure 8. The charts were later refined by Robertson (Ref. 5) to utilize normalized tip resistance (Q_t) versus normalized friction ratio (F_r) and normalized tip stress (Q_t) versus pore pressure ratio (B_q) Figure 9.

CPT Soil Behavior Type Legend
(Robertson et al. 1986)

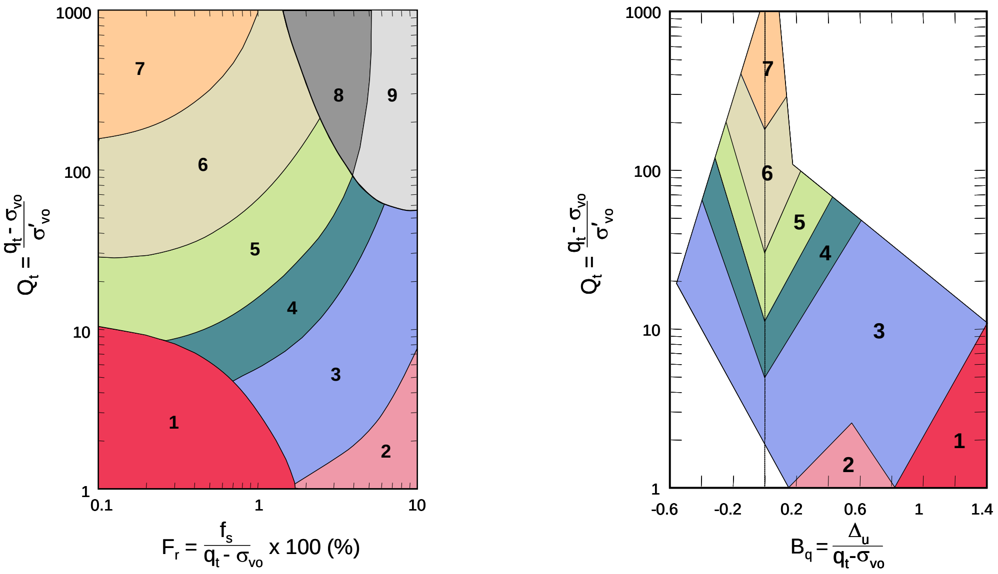


Zone		Soil Behavior Type
1	■	Sensitive, Fine Grained
2	■	Organic Material
3	■	Clay
4	■	Silty Clay to Clay
5	■	Clayey Silt to Silty Clay
6	■	Sandy Silt to Clayey Silt
7	■	Silty Sand to Sandy Silt
8	■	Sand to Silty Sand
9	■	Sand
10	■	Gravelly Sand to Sand
11	■	Very Stiff Fine Grained*
12	■	Sand to Clayey Sand*

*Overconsolidated or Cemented

Figure 8. 1986 Soil Behavior Charts

CPT Soil Behavior Type Legend (Robertson et al. 1990)



Zone		Soil Behavior Type
1	🟥	Sensitive, Fine Grained
2	🟥	Organic Soils-Peats
3	🟦	Clays; Clay to Silty Clay
4	🟦	Silt Mixtures; Clayey Silt to Silty Clay
5	🟩	Sand Mixtures; Silty Sand to Sandy Silt
6	🟨	Sands; Clean Sands to Silty Sands
7	🟧	Gravelly Sand to Sand
8	⬛	Very Stiff Sand to Clayey Sand*
9	⬜	Very Stiff Fine Grained*

*Overconsolidated or Cemented

Figure 9. 1990 Soil Behavior Charts

The normalized tip resistance is defined as:

$$Q_t = \frac{q_t - \sigma_{vo}}{\sigma'_{vo}} \qquad \textbf{(3.1)}$$

The normalized friction ratio is defined as:

$$F_r = \frac{f_s}{q_t - \sigma_{vo}} x\,100 \qquad \textbf{(3.2)}$$

where: f_s = sleeve friction

q_t = corrected tip resistance

σ_{vo} = total overburden stress

σ'_{vo} = effective overburden stress

The intersection point of the Q_t and F_r values normally falls in a classification zone**.** Each zone corresponds to a Soil Behavior Type (SBT), which is identified by the descriptions shown in Figures 8 and 9. The graphical representation of zone numbers and the corresponding soil behavior types are plotted numerically and are identified in Figures 8 and 9. At some depths, the CPT data will fall outside of the range of the chart. When this occurs, the SBT is undefined and a break is seen in the SBT profile. This occasionally occurs at the top of a penetration where the effective vertical stress is very small, which results in normalized cone resistances greater than 1000.

The classification profiles are very detailed due to the high rate of data acquisition every 2 cm (0.8 in) for CPT profiles. Frequently significant variability in soil types over small changes in elevation can be observed in the profiles. To provide a simplified soil stratigraphy for comparison to standard boring logs, a layering and generalized classification system was implemented. Layer thicknesses are determined based on the variability of the SBT profile. The layering sequence is begun at the ground surface and layer thicknesses are determined by changes in the soil behavior type. The friction ratio is used to identify potential changes in soil layering. The SBT modal value for each potential layer is compared to the previous layer. Whenever the modal value changes, a new layer is started. The SBT for the layer is the mode of the SBT values of the complete layer.

Although not presented on the CPT profiles included in Appendix A, the electronic text and/or numerical files contain classification values based on the pore pressure ratio. This method uses the normalized corrected tip stress in bars and the pore pressure ratio $B_{q.}$ (Ref. 2).

$$B_q = \frac{u_{meas} - u_o}{q_t - \sigma_{vo}} \tag{3.3}$$

where: u_{meas} = measured penetration pore pressure

u_o = static pore pressure, determined from the water table elevation

q_t = corrected tip resistance

σ_{vo} = total overburden stress

The intersection point of the Q_t and B_q values normally fall in a SBT zone. The SBT zone number corresponds to a soil behavior type as shown in Figure 9. when this occurs, the SBT is undefined and a break is seen in the SBT profile. Close analysis of this chart indicates that as the zone numbers vary, so does the soil grain size. What is missing in these charts are mixed soils, such as sandy clays or clayey sands. This type of mixed soil represents special cases, which may be misclassified as silts.

STANDARD PENETRATION TEST

Data correlations between the cone penetrometer tip stress measurements, q_c, and standard penetration test blow count, (N), have been made by a number of researchers. Robertson and Campanella (Ref. 2) summarized many of these studies and presented a relationship between q_c, N, and soil type. The blow count corresponding to 60 percent of the energy transferred to the sampler can be estimated from a ratio based on the soil behavior type number applicable for the soil behavior type. Robertson and Campanella used the 1986 soil behavior chart (Figure 8) when determining these ratios. These SBT values are included in the electronic files. The ratios used to compute the N value were as follows:

Zone	**Soil Behavior Type** *(Robertson et al. 1986)*	**$(q_c/p_a)/N$ Ratio**
1	Sensitive fine grained	2
2	Organic material	1
3	Clay	1
4	Silty clay to clay	1.5
5	Clayey silt to silty clay	2
6	Sandy silt to clayey silt	2.5
7	Silty sand to sandy silt	3
8	Sand to silty sand	4
9	Sand	5
10	Gravelly sand to sand	6
11	Veru stiff fine grained	1
12	Sand to clayey sand	2

The correlation between q_c and N_{60} should be considered an estimate only, because rapid fluctuations in tip stress can result in large variations in the calculated blow count. Also, the techniques used in performing the SPT test in any geographical area need to be considered. If the energy level normally transferred to the sampler is not nearly 60 percent of the theoretical maximum, the local correlation will be either higher or lower than the data presented in this report.

FRICTION ANGLE (ϕ')

The effective stress friction angle in granular soils can be estimated from the tip resistance data using an empirical correlation derived between laboratory triaxial tests on sands and penetration tests performed through sands in large calibration chambers. The triaxial tests were performed at confining stresses equal to the horizontal effective stress in the calibration chamber.

The tip stress data were then correlated with peak effective friction angle as (Ref. 2):

$$\tan\phi' = 0.38\left[\log_{10}\frac{q_c}{\sigma'_{vo}}\right] + 0.1 \tag{3.4}$$

where: ϕ' = effective internal friction angle (deg)

q_c = total measured tip stress

σ'_{vo} = effective overburden stress

UNDRAINED SHEAR STRENGTH (S_u)

Estimates of the undrained shear strength in fine grained saturated soils can be made using the empirical relationship (Ref.2):

$$S_u = \frac{q_c - \sigma_{vo}}{N_k} \tag{3.5}$$

where: S_u = undrained shear strength

q_c = total measured tip stress

σ_{vo} = total overburden stress

N_k = cone factor, assumed to be 15 for A. W. Vogtle Nuclear Plant site data

The cone factor, N_k falls between 11 and 19 with an average of 15. In the absence of field vane shear data, as is the case for the A. W. Vogtle Nuclear Plant investigation, Robertson and Campanella (Ref. 2) recommend assuming N_k to be 15. If N_k is 19 for a given material, using N_k of 15 overestimates the undrained shear strength by 27%; and if N_k is 11, the strength is underestimated by 27%.

PRESENTATION OF ϕ AND S_u VALUES

Conventional engineering considers only friction angles (ϕ') to be appropriate in granular soil deposits such as sands. Similarly, undrained shear strength (S_u) values are used in saturated, low permeability layers such as clays. The distinction between which parameter is appropriate at a given depth is based on the soil behavior type. When the average SBT number is greater than 4, the granular material is assumed to dominate and the friction angle is plotted. Conversely, if the SBT number is less than or equal to 5, the fine-grained material is assumed to dominate and the undrained shear strength is plotted. These SBT numbers are found in the electronic files supplied with this report. Both values are plotted for SBT values of 4 and 5. When the data do not fall within the range of the classification system, neither ϕ' or S_u values are presented.

ESTIMATES OF OVERCONSOLIDATION RATIO (OCR)

A soil is termed normally consolidated if the current stress is the maximum to which the material has ever been subjected. The overconsolidation ratio (OCR) is defined as:

$$\mathrm{OCR} = \frac{(\sigma'_{vo})_{\mathrm{max.past}}}{(\sigma'_{vo})_{\mathrm{present}}} \qquad \textbf{(3.6)}$$

where: $(\sigma'_{vo})_{\mathrm{max.past}}$ = maximum past vertical effective overburden pressure

$(\sigma'_{vo})_{\mathrm{present}}$ = present effective vertical overburden pressure

For a normally consolidated soil, $(\sigma'_{vo})_{\mathrm{max.past}} = (\sigma'_{vo})_{\mathrm{present}}$ and OCR = 1, while an overconsolidated soil has an OCR > 1.

OCR calculations for the A. W. Vogtle Nuclear Plant investigation were reported for all soil behavior types and are based on a publication by Mayne (Ref. 3) where OCR is directly correlated to excess pore pressure measured on the cone tip and only apply to cohesive soils. As determined from a linear regression of published data, this equation is:

$$\mathrm{OCR} = 0.33\left[\frac{u_{\mathrm{meas}} - u_o}{\sigma'_{vo}}\right]^{1.42} \qquad \textbf{(3.7)}$$

COEFFICIENT OF LATERAL CONSOLIDATION *(C_H)*

Horizontal coefficients of consolidation can be calculated from the pore pressure dissipation tests using a theoretical model developed by Baligh and Levadoux (Ref. 4) and measured dissipation rates. Calculations are performed at 50% of the excess pore pressure dissipation, U_{50}. Using the theoretical curves in Figure 10, C_H is calculated as:

$$C_H = \frac{T_{50} R^2}{t_{50}} \tag{3.8}$$

where: T_{50} = theoretical time factor at 50% dissipation

R = radius of cone in centimeters, 2.22 cm for the 1.75-inch diameter cone used at the A. W. Vogtle Nuclear Plant site

t_{50} = measured time at 50% dissipation in seconds

Pore pressure measurements are made just behind the tip; hence, curve 3 in Figure 10 is used to determine T_{50} equals 5.5. Estimates of C_H for the applicable dissipation test locations are contained in the summary table in Appendix C.

COEFFICIENT OF LATERAL PERMEABILITY *(K_H)*

The coefficient of lateral permeability is calculated based on the coefficient of lateral consolidation estimated from the pore pressure dissipation test described above and an estimate of the in situ constrained modulus, *M*, obtained from measured tip resistance values and soil classification according to:

$$K_H = \frac{C_H \gamma_w}{M} \tag{3.9}$$

where: C_H = coefficient of lateral consolidation

γ_w = unit weight of water

M = constrained modulus

The constrained modulus, *M*, can be estimated using the empirical relationship:

$$M = \alpha \, q_c = \frac{1}{m_v} \tag{3.10}$$

This method is discussed by Robertson and Campanella (Ref. 2).

where: α = empirical factor

q_c = measured tip resistance, not corrected for pore pressure effects

m_V = volumetric compressibility.

The factor α is obtained from (Ref. 2) is based on the uncorrected tip resistance and soil type. Estimates of M and K_H are contained in the summary table in Appendix C. Values for q_c are obtained from the depth interval closest to the depth of dissipation test.

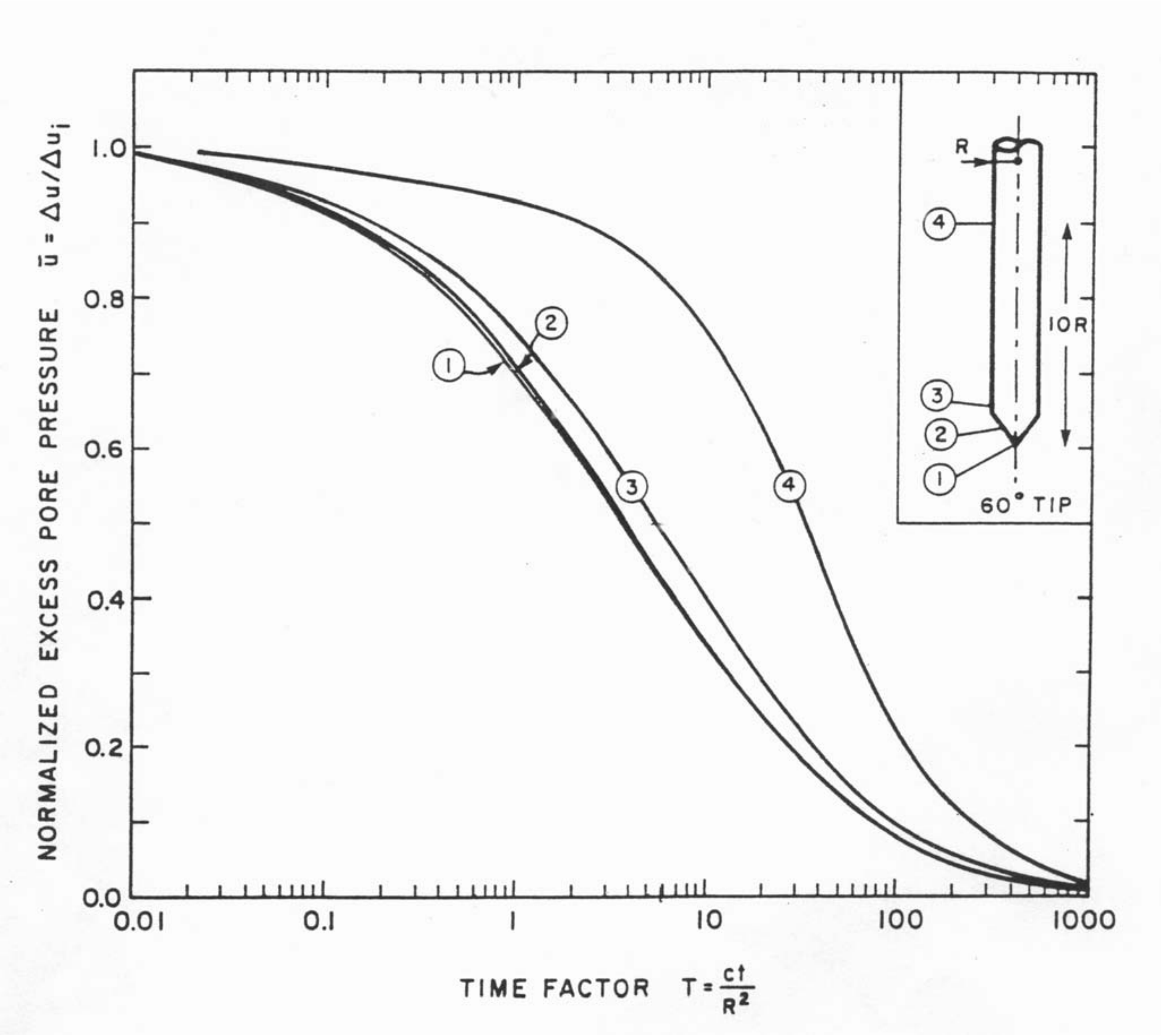
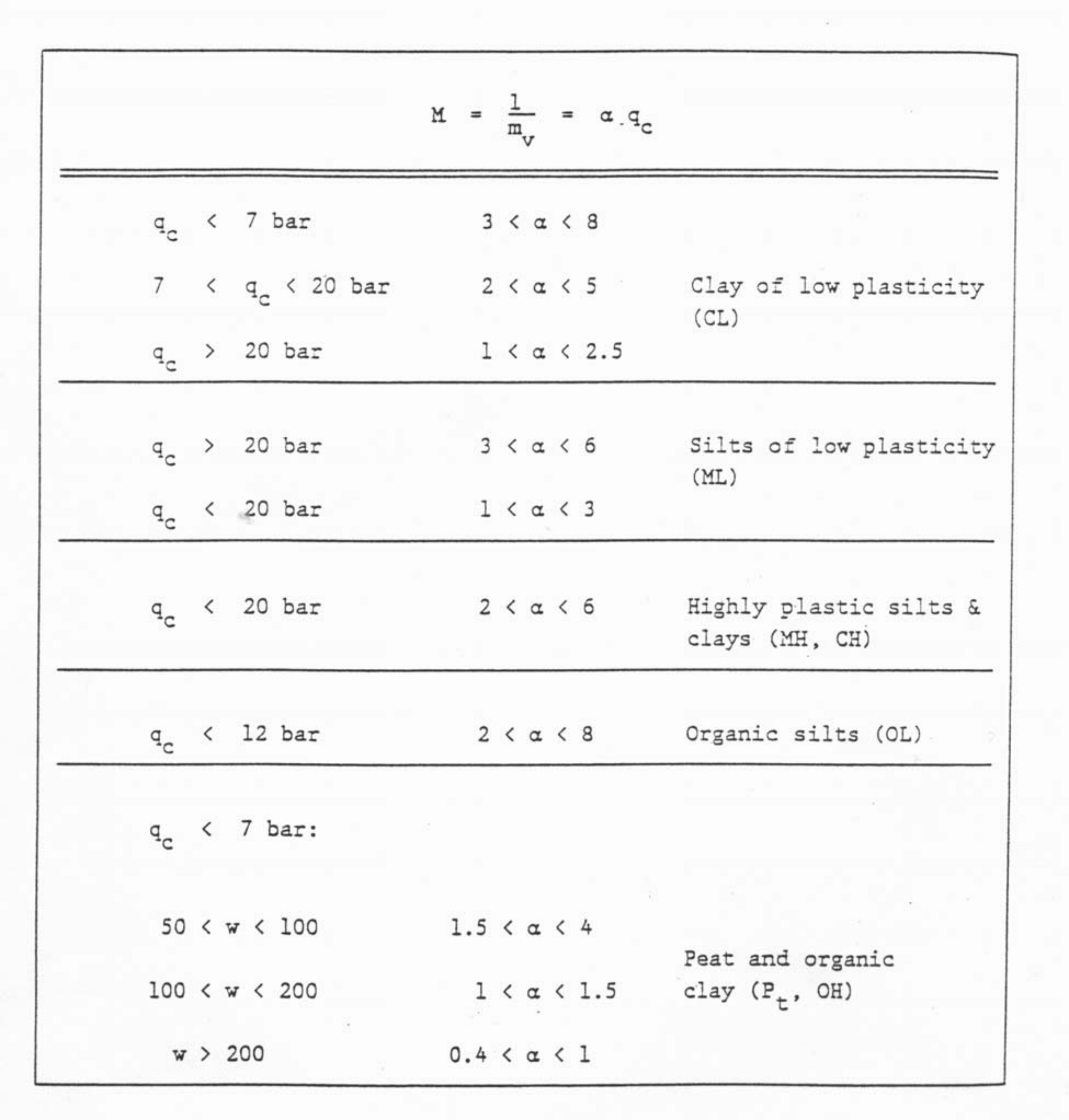


Figure 10. Dissipation Curves for a 60° Cone According to Linear Isotropic Uncoupled Solution (after Baligh and Levadoux, 1980)



$$M = \frac{1}{m_v} = \alpha . q_c$$

$q_c < 7$ bar	$3 < \alpha < 8$	Clay of low plasticity (CL)
$7 < q_c < 20$ bar	$2 < \alpha < 5$	
$q_c > 20$ bar	$1 < \alpha < 2.5$	
$q_c > 20$ bar	$3 < \alpha < 6$	Silts of low plasticity (ML)
$q_c < 20$ bar	$1 < \alpha < 3$	
$q_c < 20$ bar	$2 < \alpha < 6$	Highly plastic silts & clays (MH, CH)
$q_c < 12$ bar	$2 < \alpha < 8$	Organic silts (OL)
$q_c < 7$ bar:		Peat and organic clay (P_t, OH)
$50 < w < 100$	$1.5 < \alpha < 4$	
$100 < w < 200$	$1 < \alpha < 1.5$	
$w > 200$	$0.4 < \alpha < 1$	

Figure 11. Estimation of the Constrained Modulus, M, for Clays (after Robertson and Campanella, 1988)

SECTION 4

LIST OF REFERENCES

1. American Society for Testing and Materials, "Standard Test Method for Performing Electric Friction Cone and Piezo-Cone Penetration Testing of Soil," ASTM Designation: D5778, 1995.

2. Robertson, P. K. and R. G. Campanella, *Guidelines for Using the CPT, CPTU and Marchetti DMT for Geotechnical Design,* Vol. II, University of British Columbia, Vancouver, BC, Canada, March 1988.

3. Mayne, P.W., "CPT Indexing of In Situ OCR in Clays," included in *Use of In Situ Test in Geotechnical Engineering,* S. P. Clemence, ed., Geotechnical Special Publications No. 6, proceedings of In Situ '86 Conference, sponsored by Geotechnical Engineering Division of the American Society of Civil Engineers, Blacksburg, VA, June 1986.

4. Baligh, M. M. and J. N. Levadoux, Pore Pressure Dissipation After Cone Penetration, Massachusetts Institute of Technology, Cambridge, MA, April 1980.

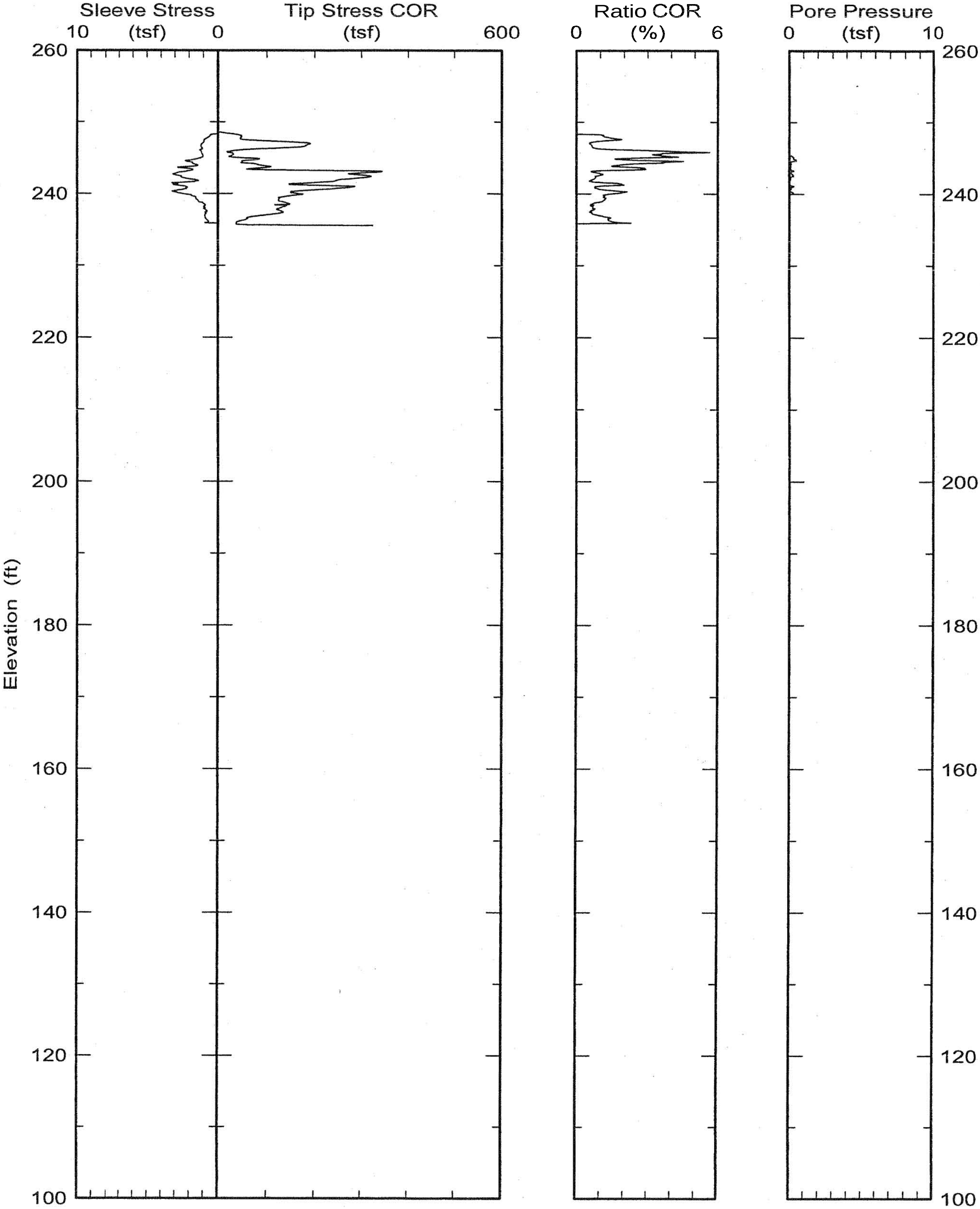
5. Robertson, P.K, "Soil classification using the cone penetration test," Canadian Geotechnical Journal, 27(1).

APPENDIX A

PIEZO-CONE PROFILES

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1001
Northing: 8028.12
Easting: 6255.96
Elevation: 248.57

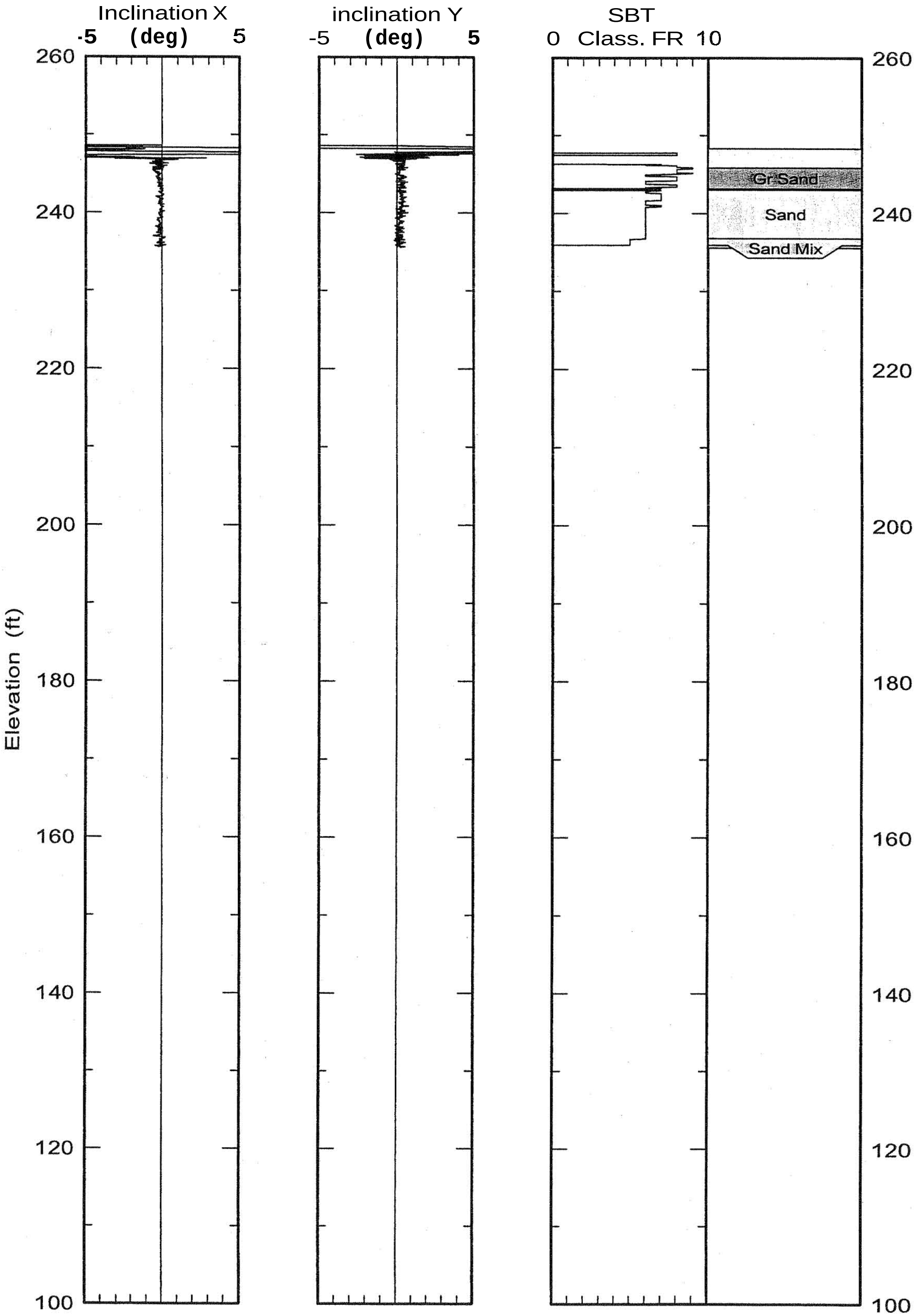


Maximum depth: 13.02 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1001

Northing: 8028.12
Easting: 6255.96
Elevation: 248.57



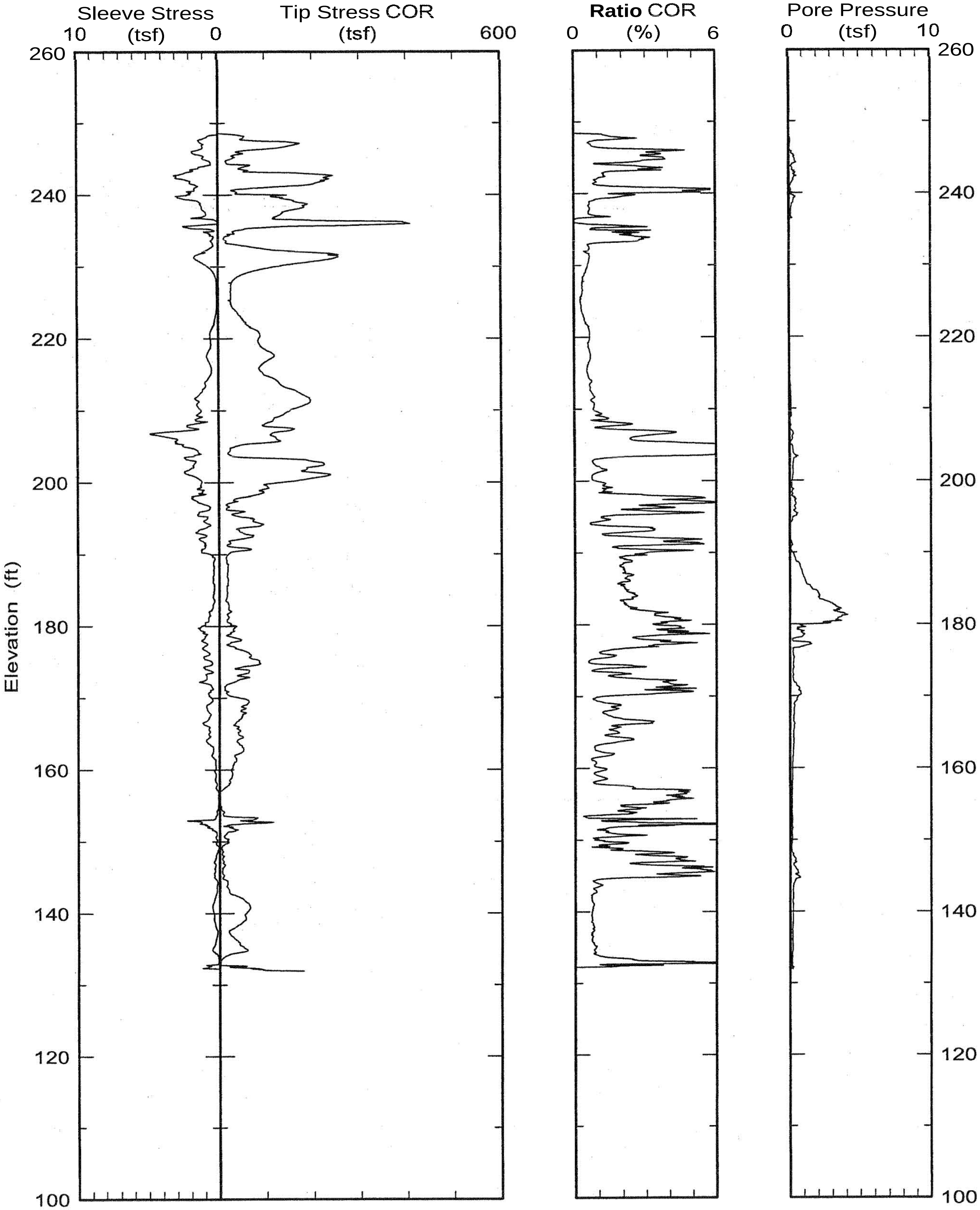
Maximum depth: 13.02 (ft)

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1001A

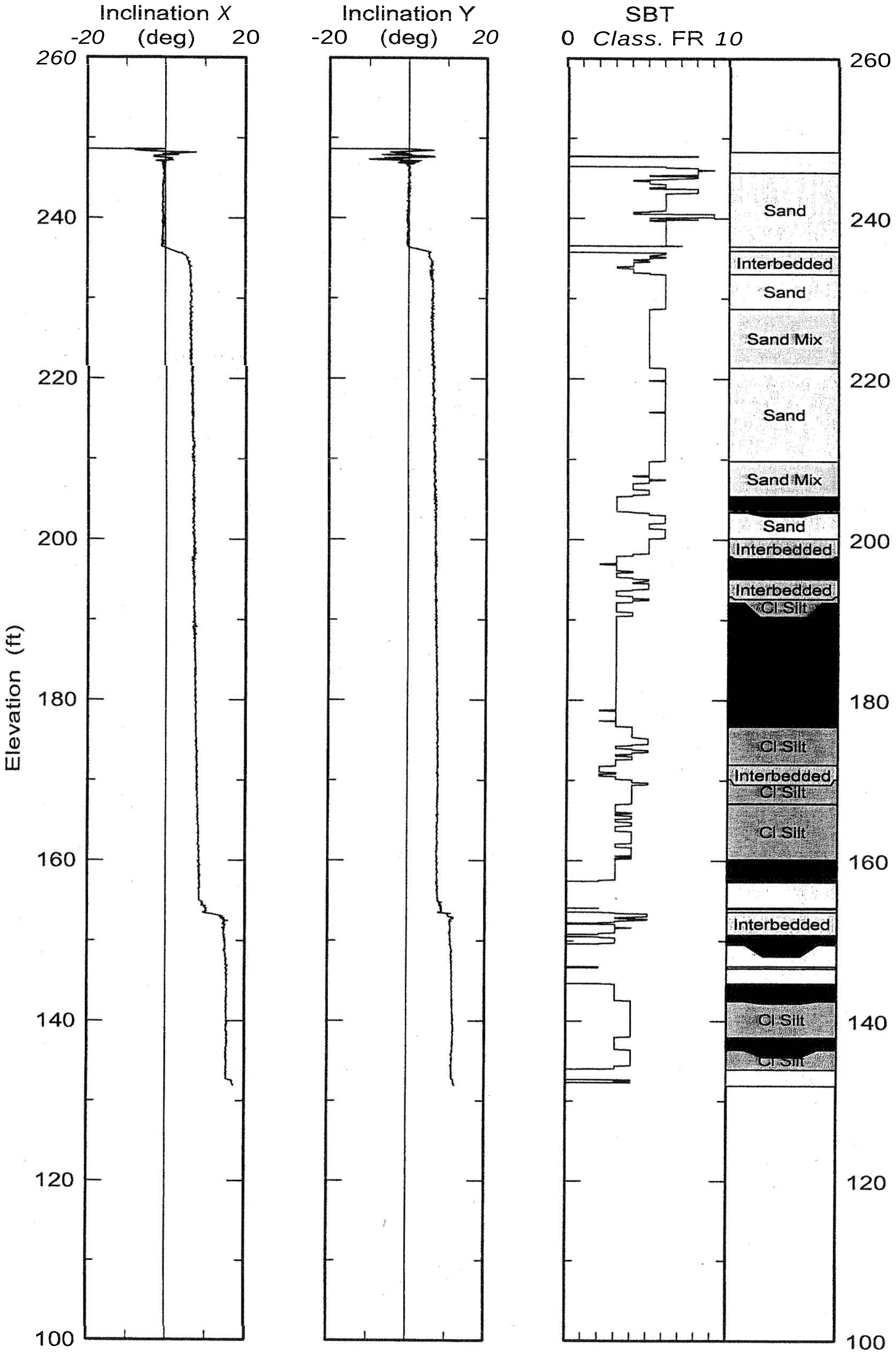
Northing: 8028.12
Easting: 6255.96
Elevation: 248.57



Maximum depth: 116.65 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1001A
Northing: 8028.12
Easting: 6255.96
Elevation: 248.57

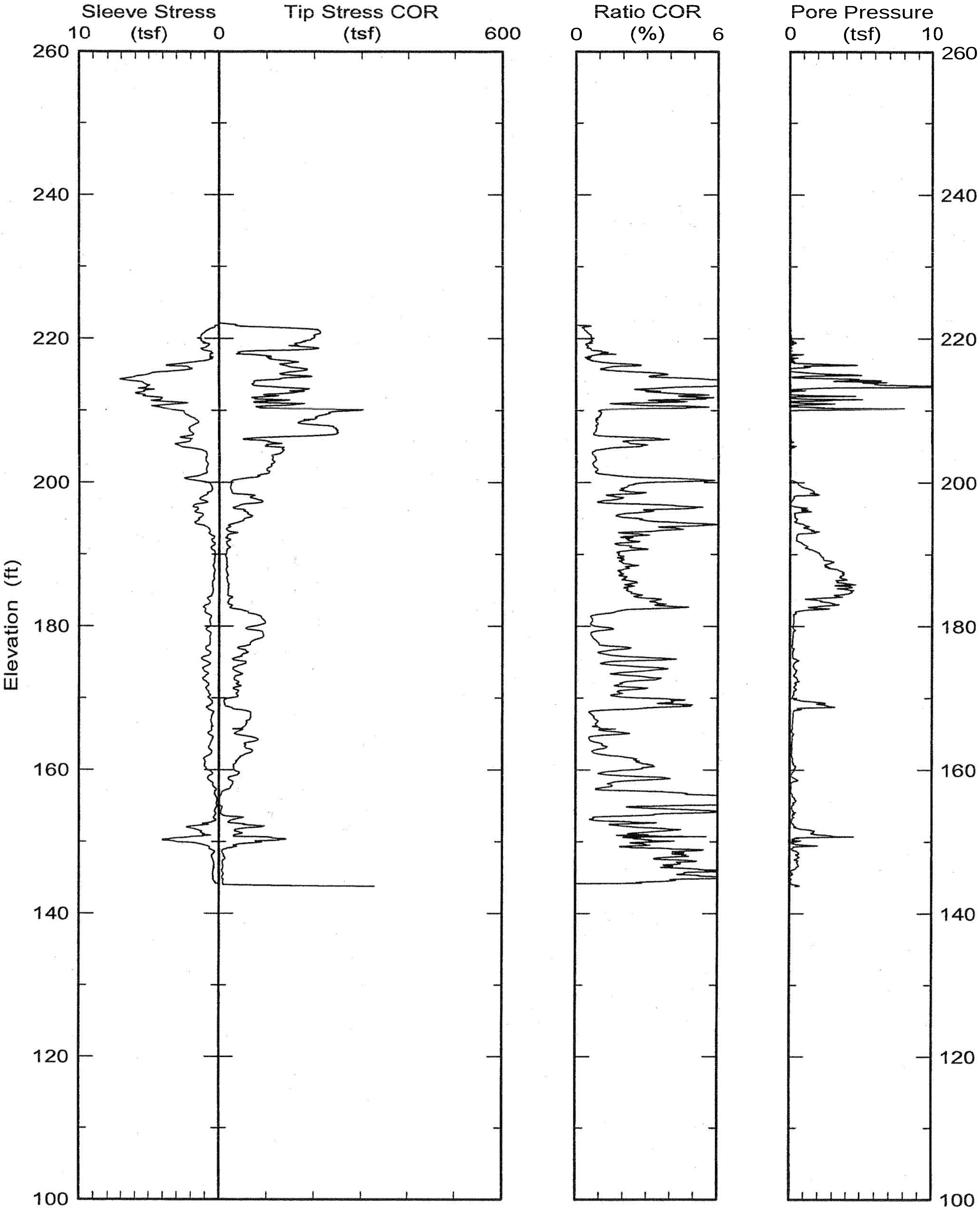


Maximum depth: 116.65 (ft)

Class FR: Friction Ratio Cla

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 06/Sep/2005
Test ID: C-1002
Northing: 7667.64
Easting: 6574.64
Elevation: 222.13

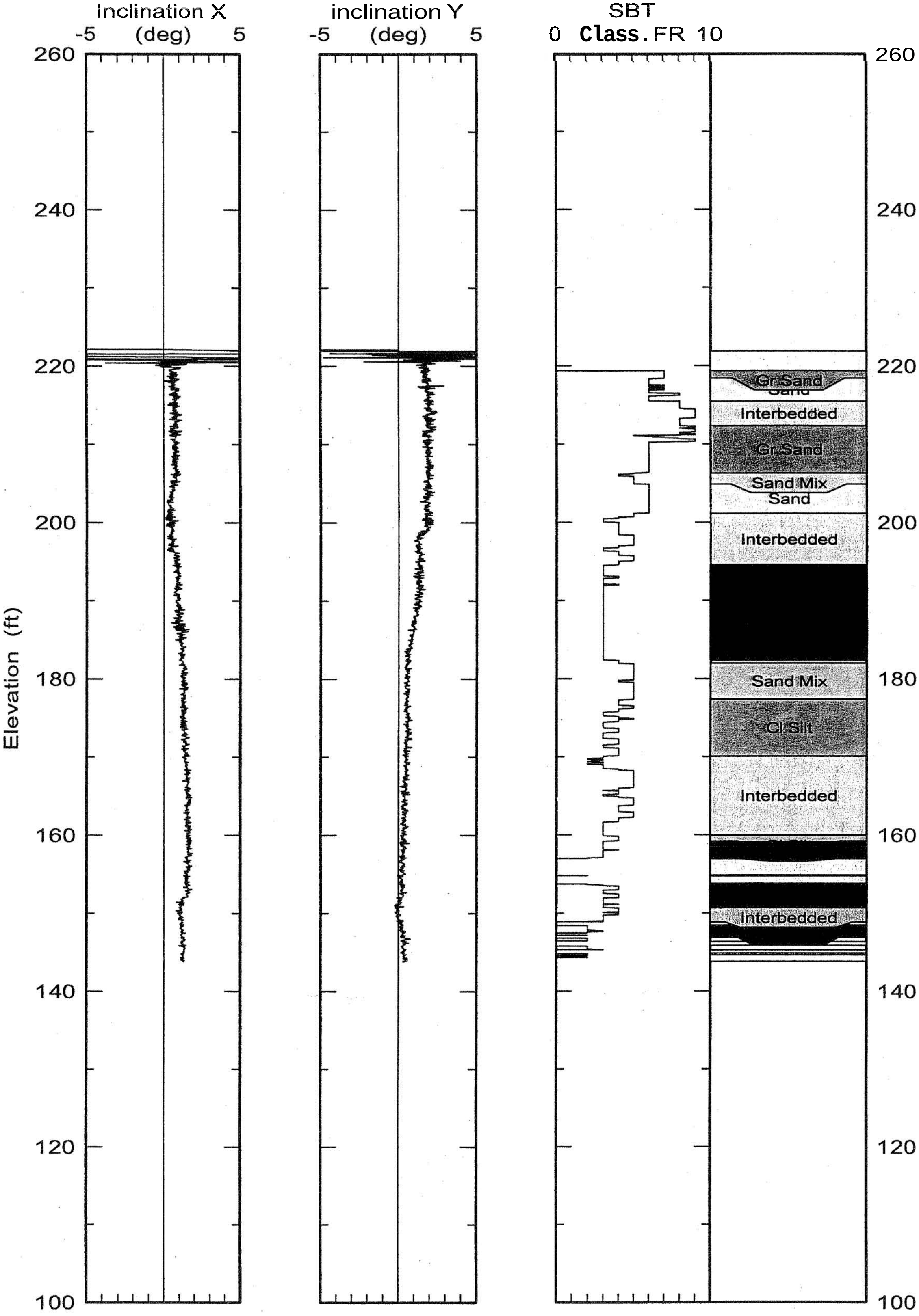


Maximum depth: ***78.33*** (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 06/Sep/2005
Test ID: C-1002

Northing: 7667.64
Easting: 6574.64
Elevation: 222.13



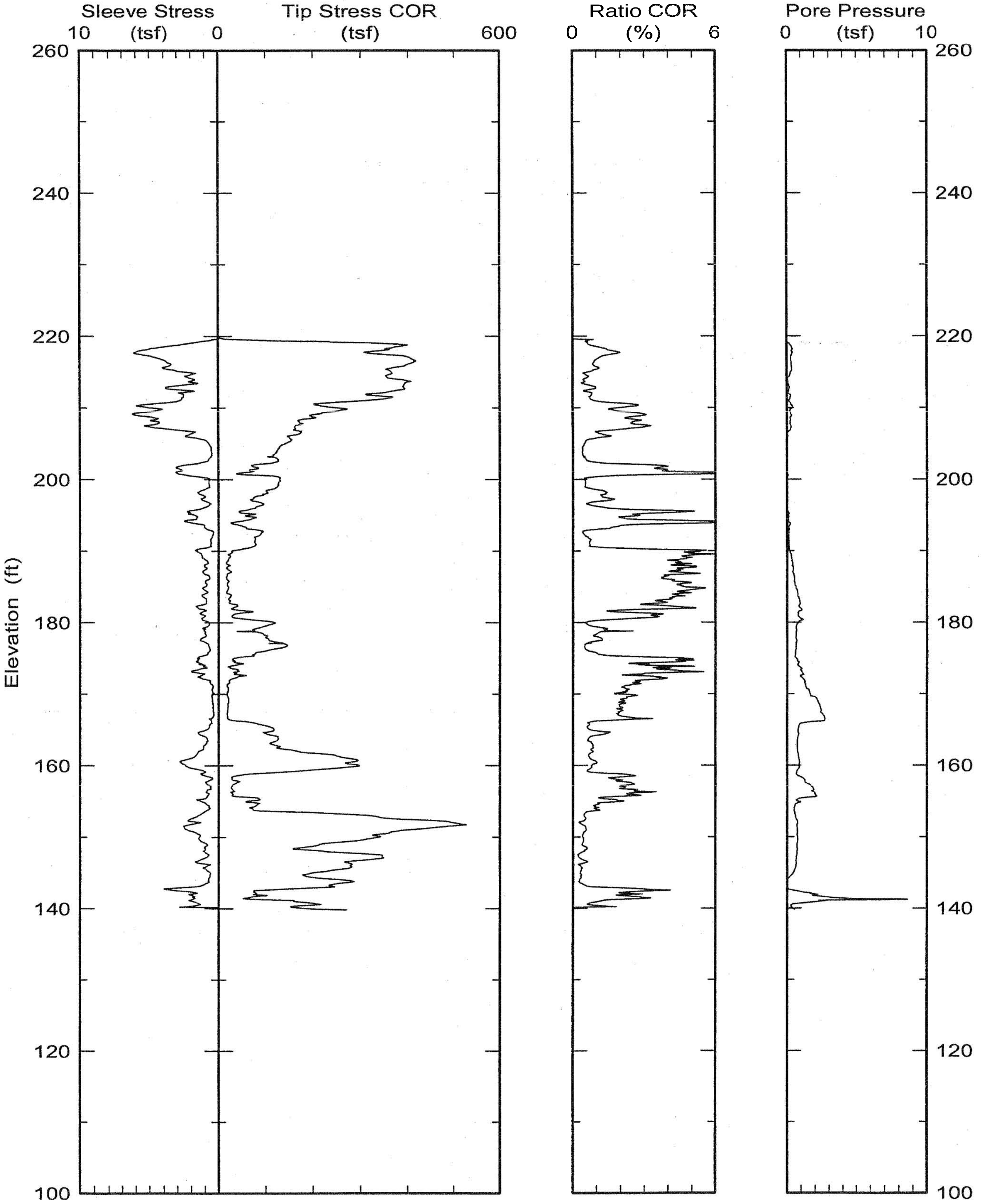
Maximum depth: *78.33* (ft)

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

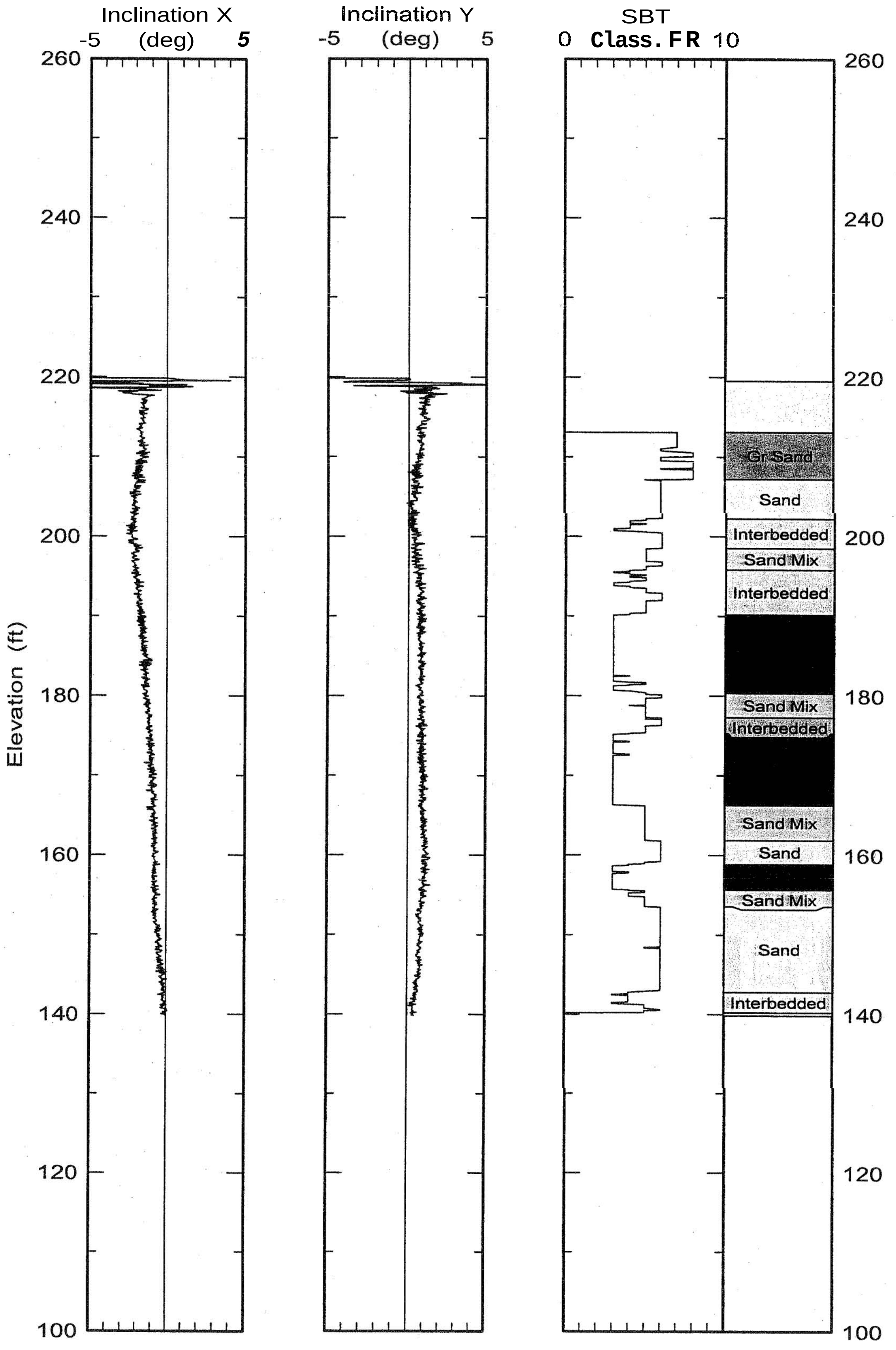
Date: 07/Sep/2005
Test ID: C-1003

Northing: 7669.31
Easting: 7477.87
Elevation: 219.80



Maximum depth: 79.97 (A)

Applied Research Associates, Inc. South Royalton, VT 05068 802-763-8348 cpt@ned.ara.com www.ara.com	Date: 07/Sep/2005 Test ID: C-1003 Northing: 7669.31 Easting: 7477.87 Elevation: 219.80



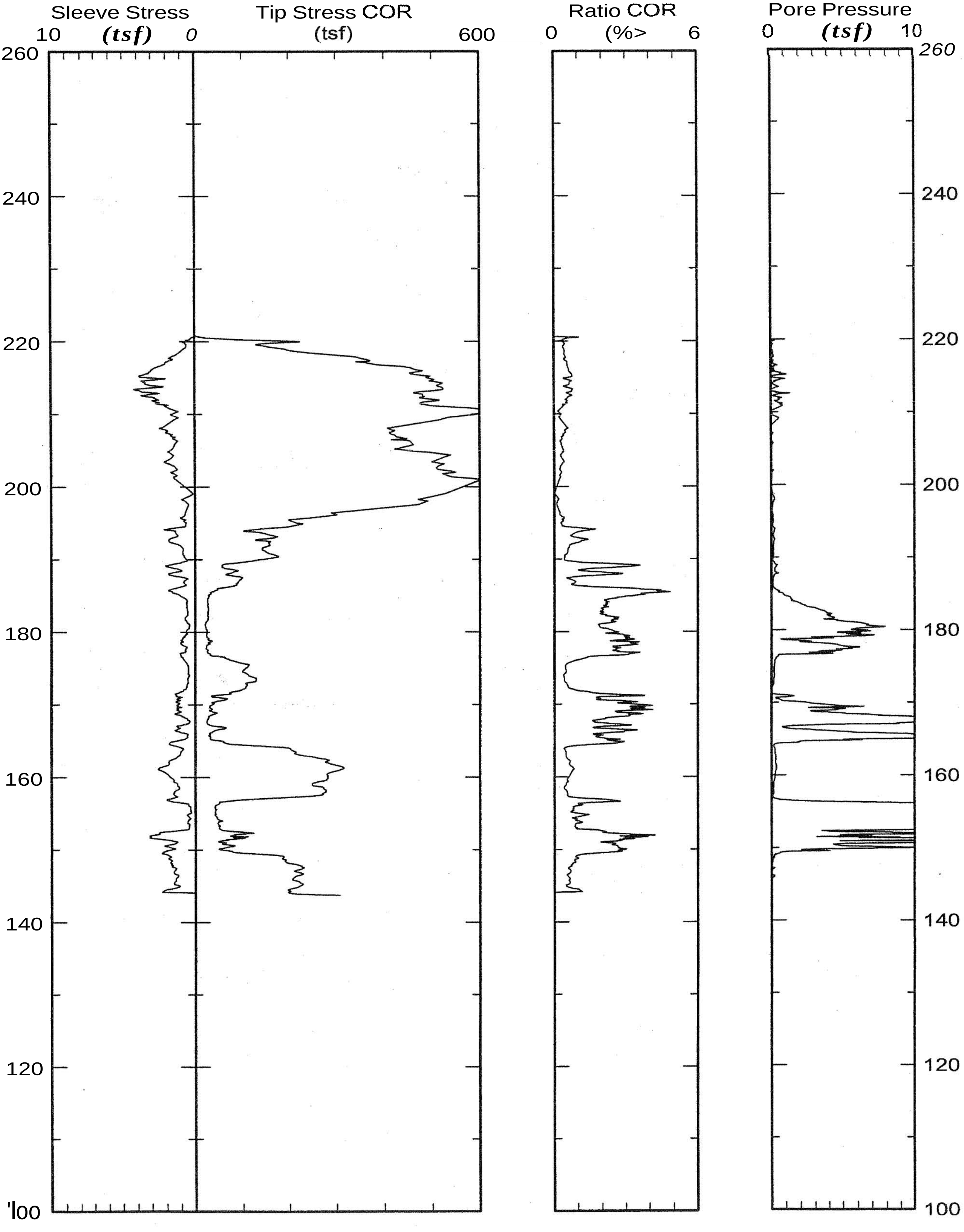
Maximum depth: 79.97 (ft)

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 01/Sep/2005
Test ID: C-1004

Northing: 7646.13
Easting: 8361.84
Eievation: 220.82

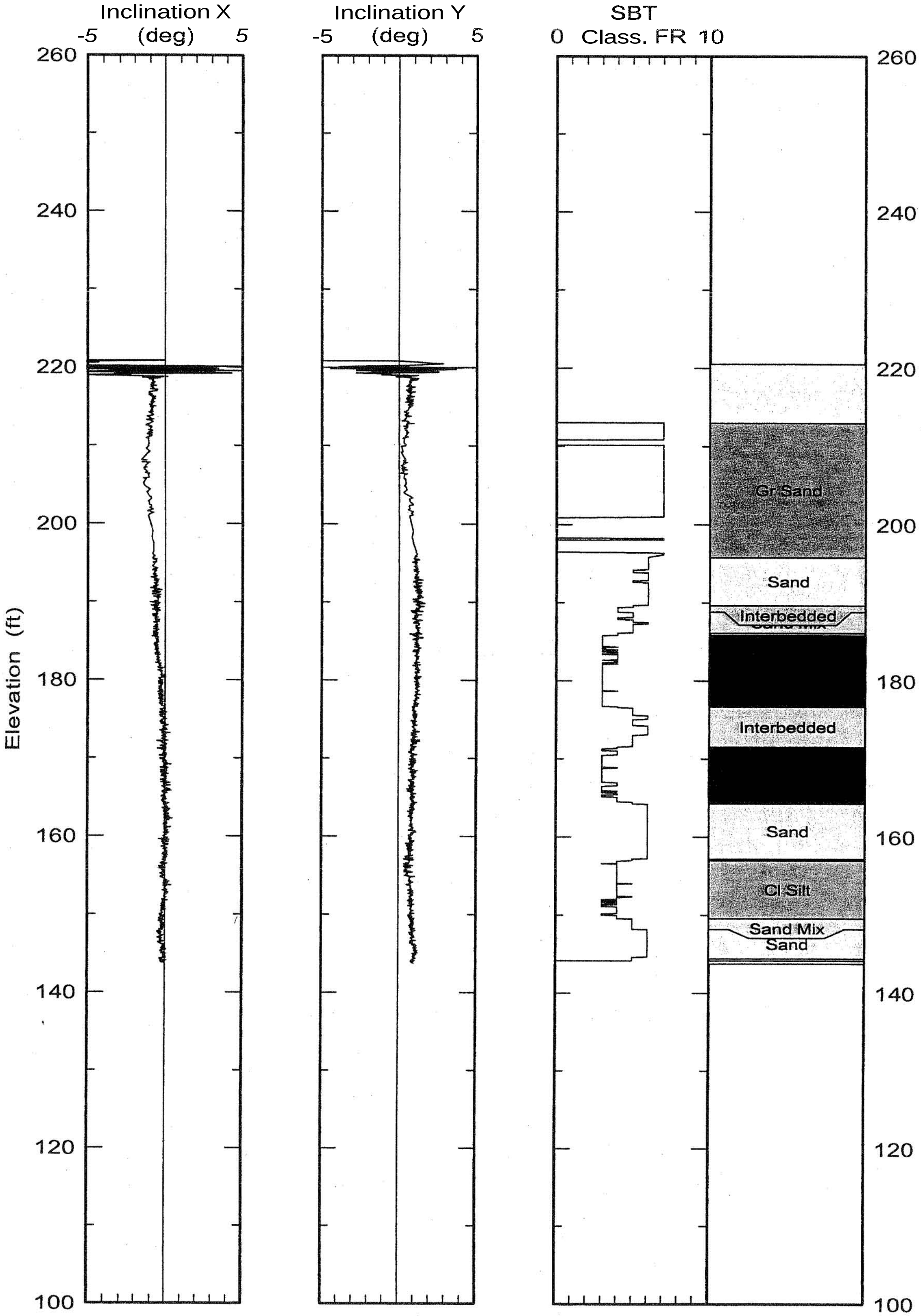


Maximum depth: *77.06* (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 01/Sep/2005
Test ID: C-1004

Northing: 7646.13
Easting: 8361.84
Elevation: 220.82



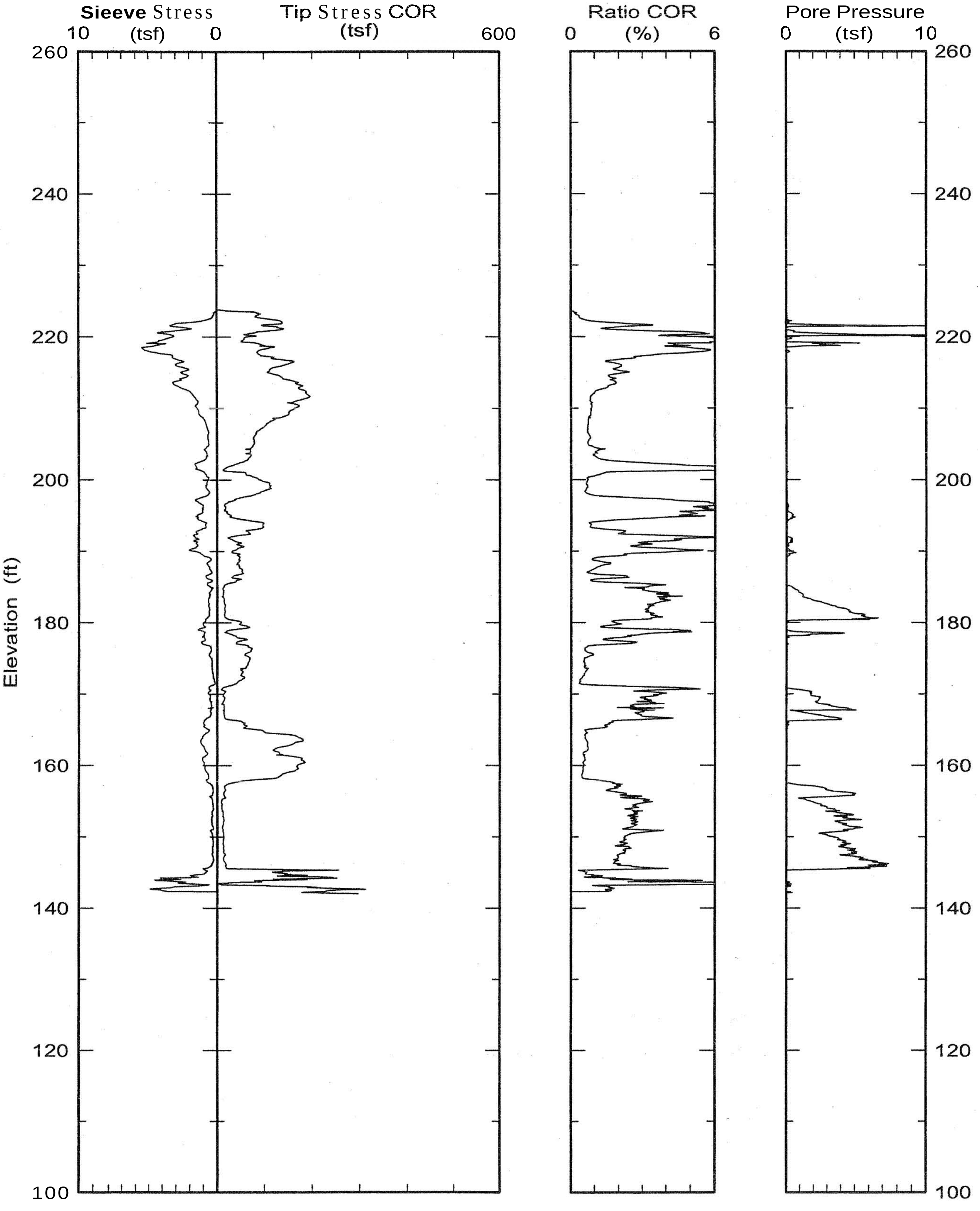
Maximum depth: *77.06* (ft)

Class FR: Friction Ratio Clas

Test ID: C-1004
File: 201S0501C.ECP

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

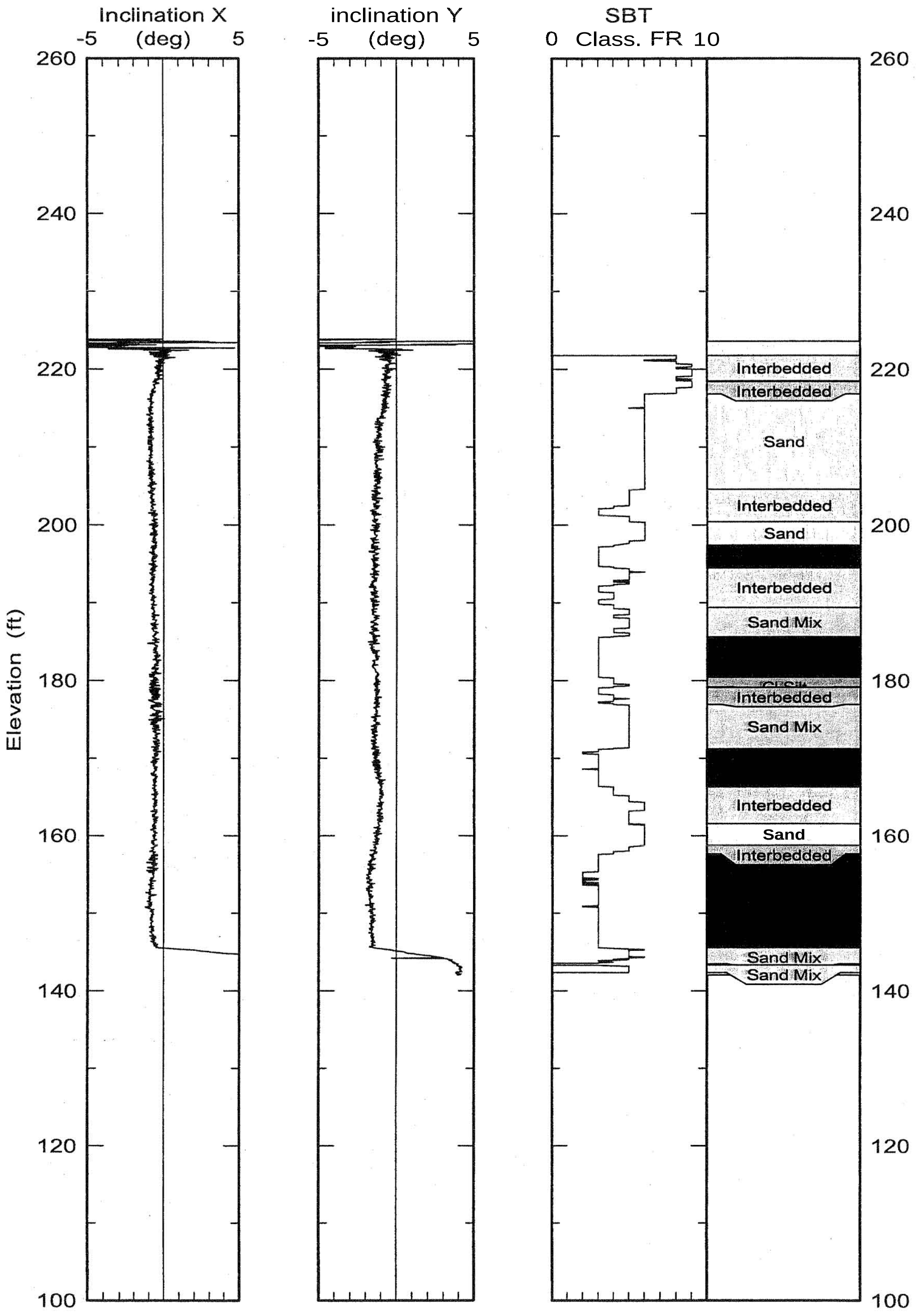
Date: 08/Sep/2005
Test ID: C-1005
Northing: 7995.26
Easting: 8174.60
Elevation: 223.81



Maximum depth: **81.80 (R)**

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 08/Sep/2005
Test ID: C-1005
Northing: 7995.26
Easting: 8174.60
Elevation: 223.81

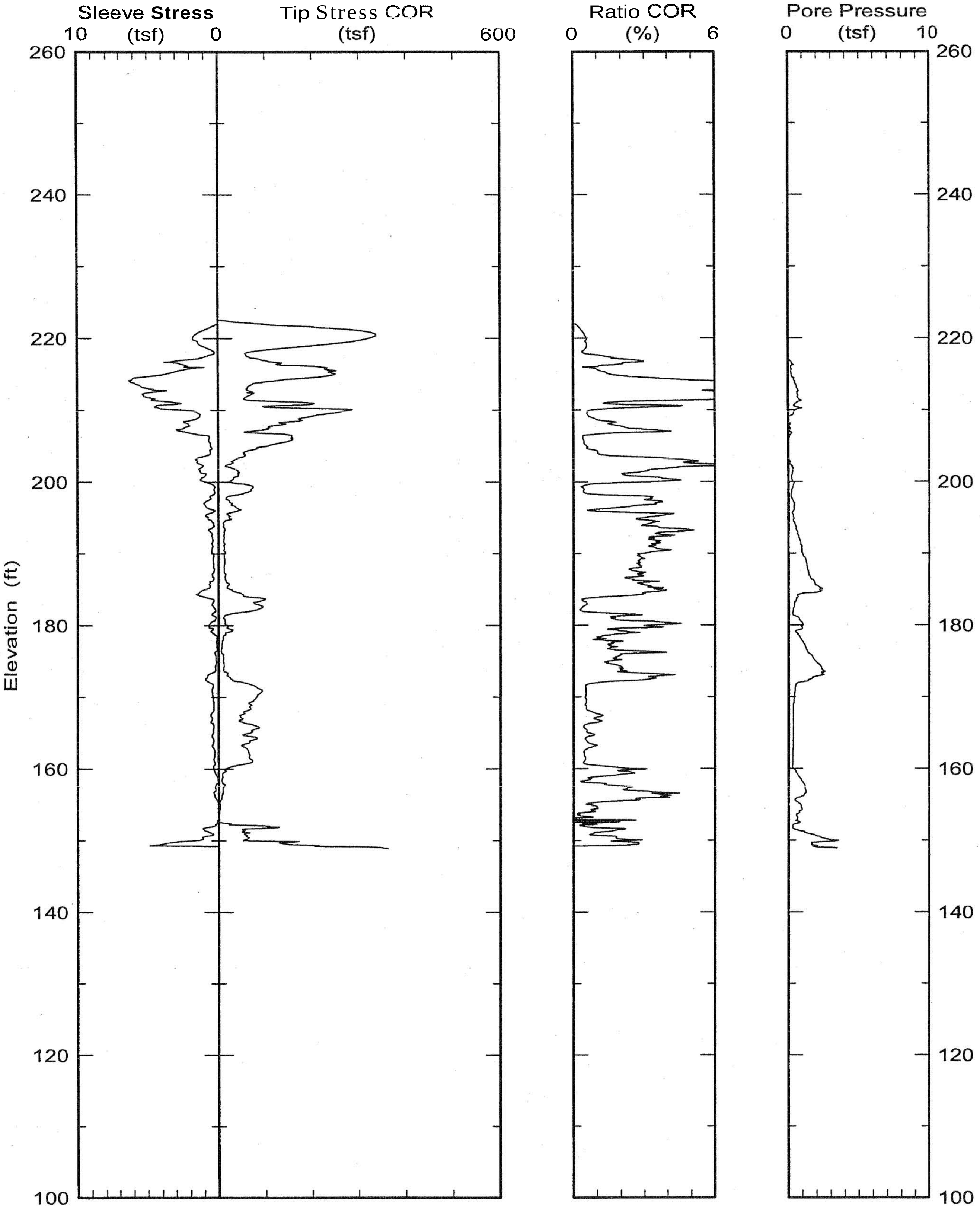


Maximum depth: 81.80 (ft)

Class FR: Friction **Ratio** Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 01/Sep/2005
Test ID: C-1006
Northing: 8001.46
Easting: 7261.58
Elevation: 222.80

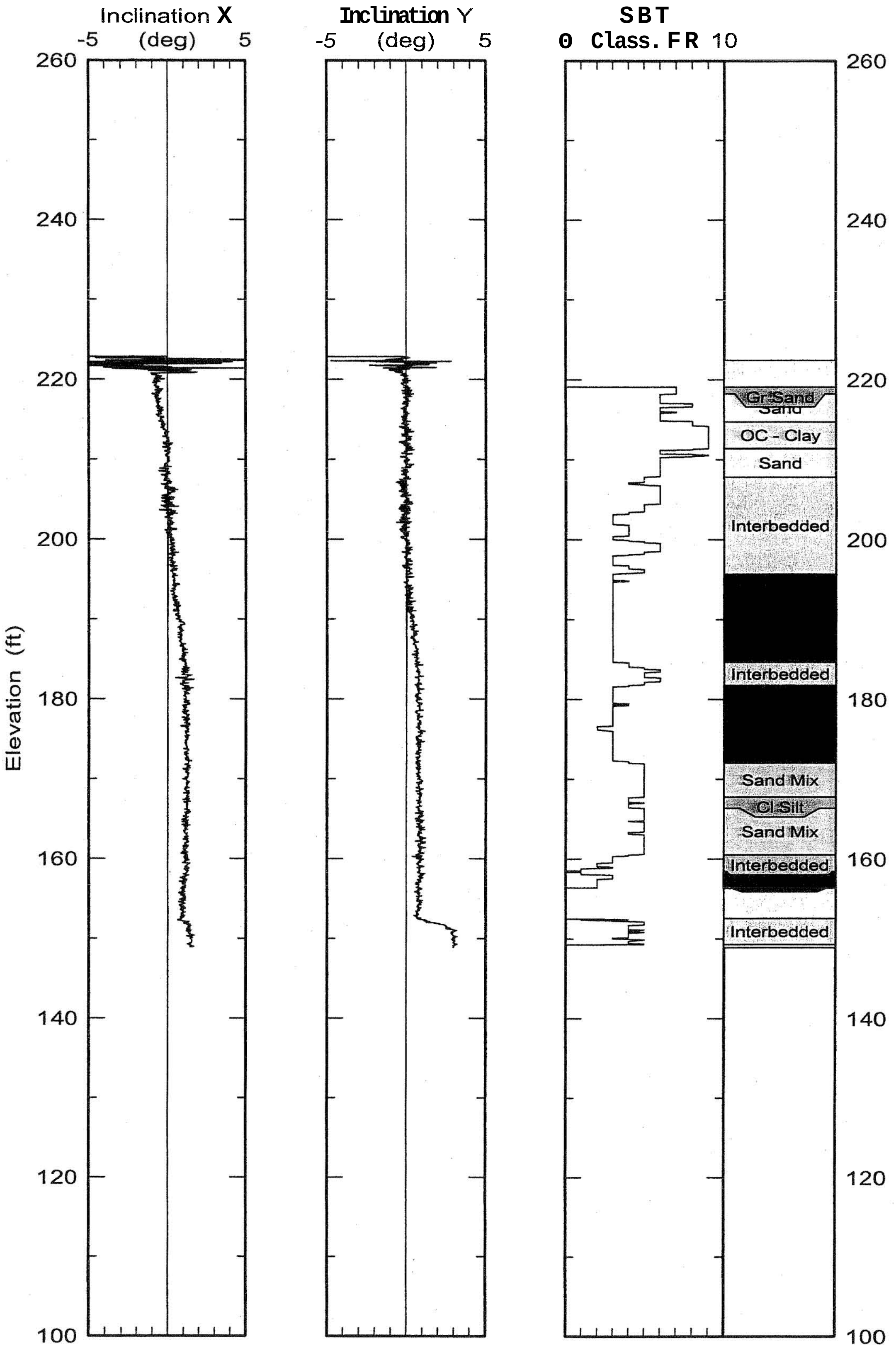


Maximum depth: 73.91 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 01/Sep/2005
Test ID: C-1006

Northing: 8001.46
Easting: 7261.58
Elevation: 222.80

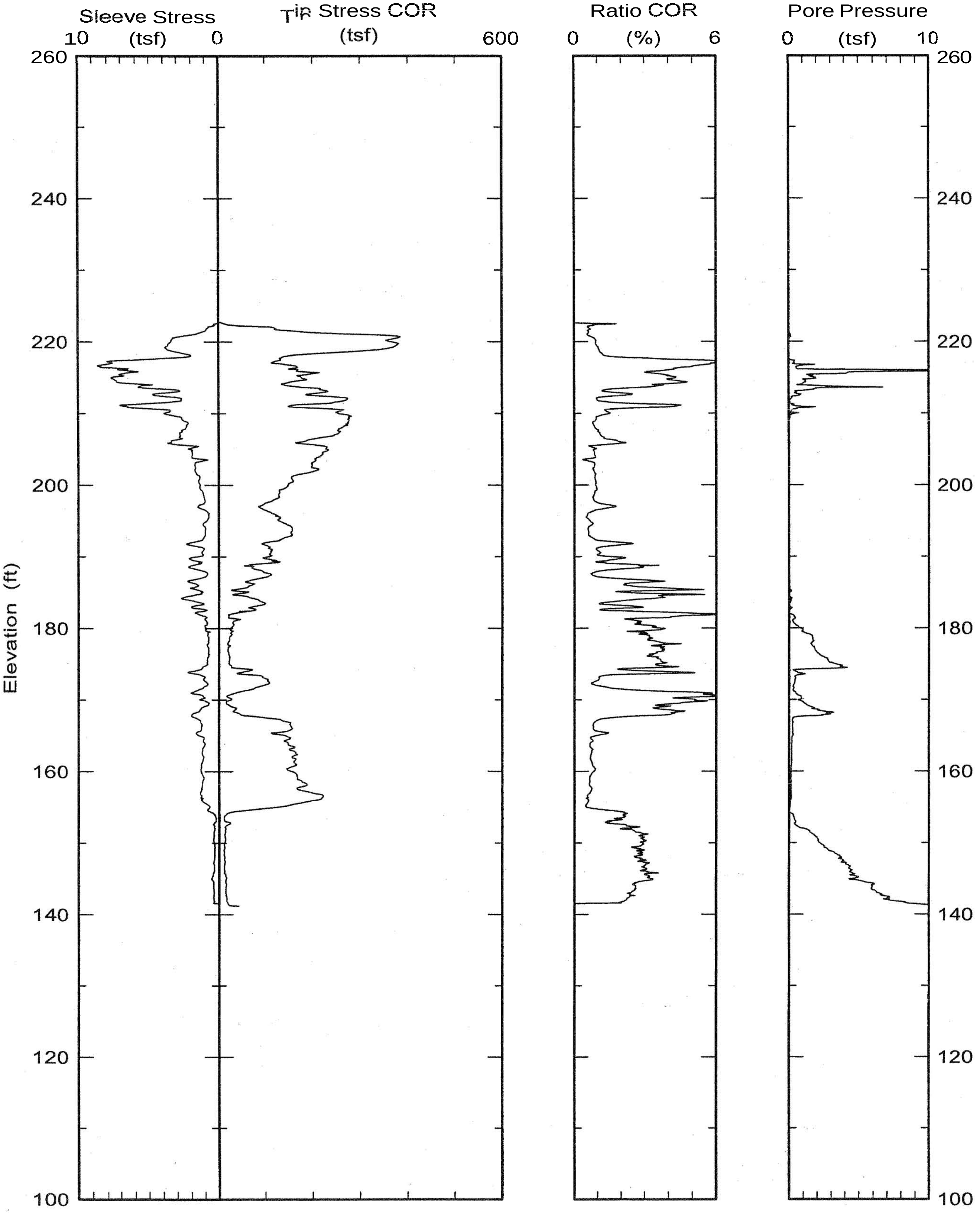


Maximum depth: 73.91 (ft)

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1007
Northing: 8270.62
Easting: 8055.05
Elevation: 222.81

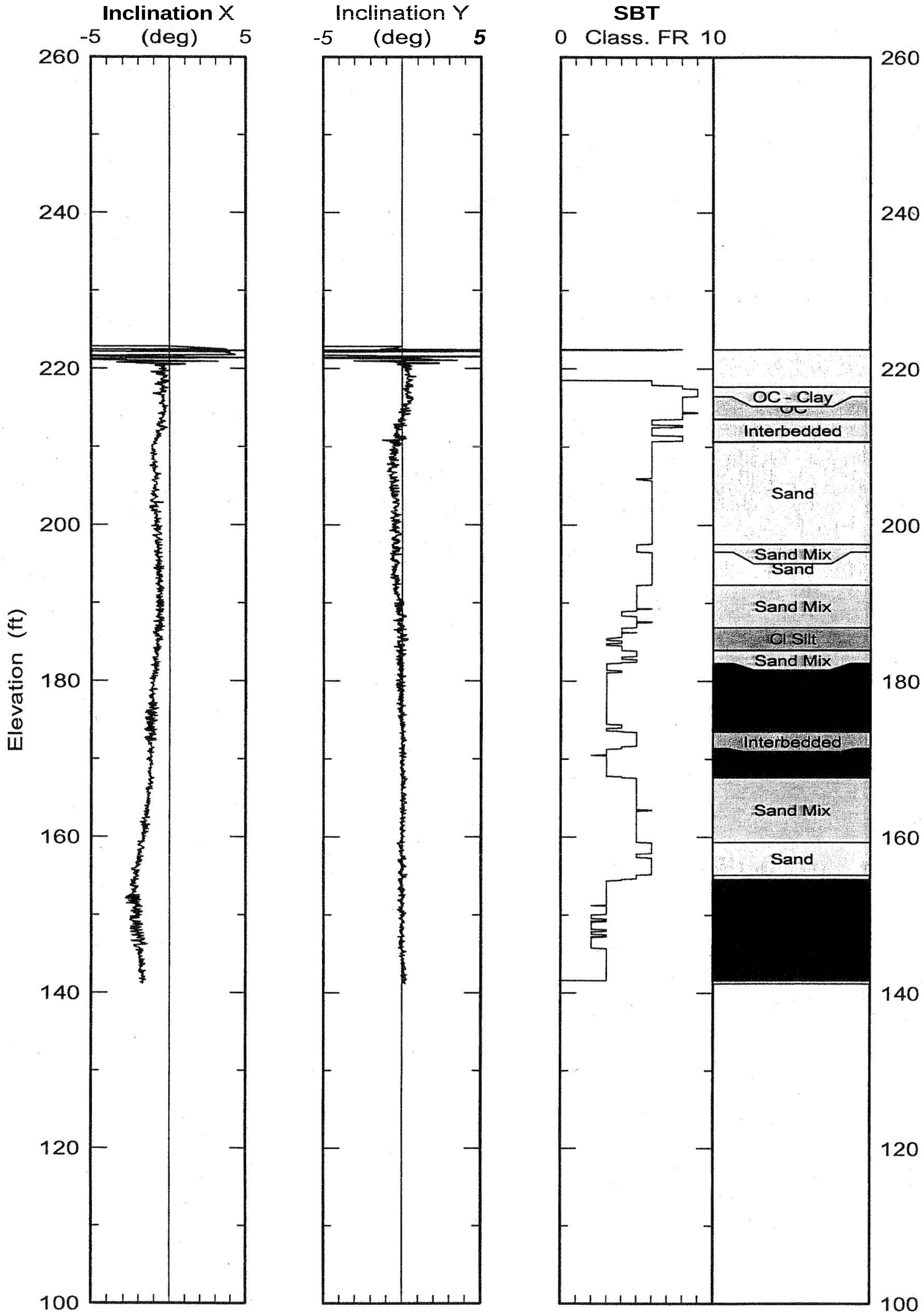


Maximum **depth:** 81.62 (A)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1007

Northing: 8270.62
Easting: 8055.05
Elevation: 222.81



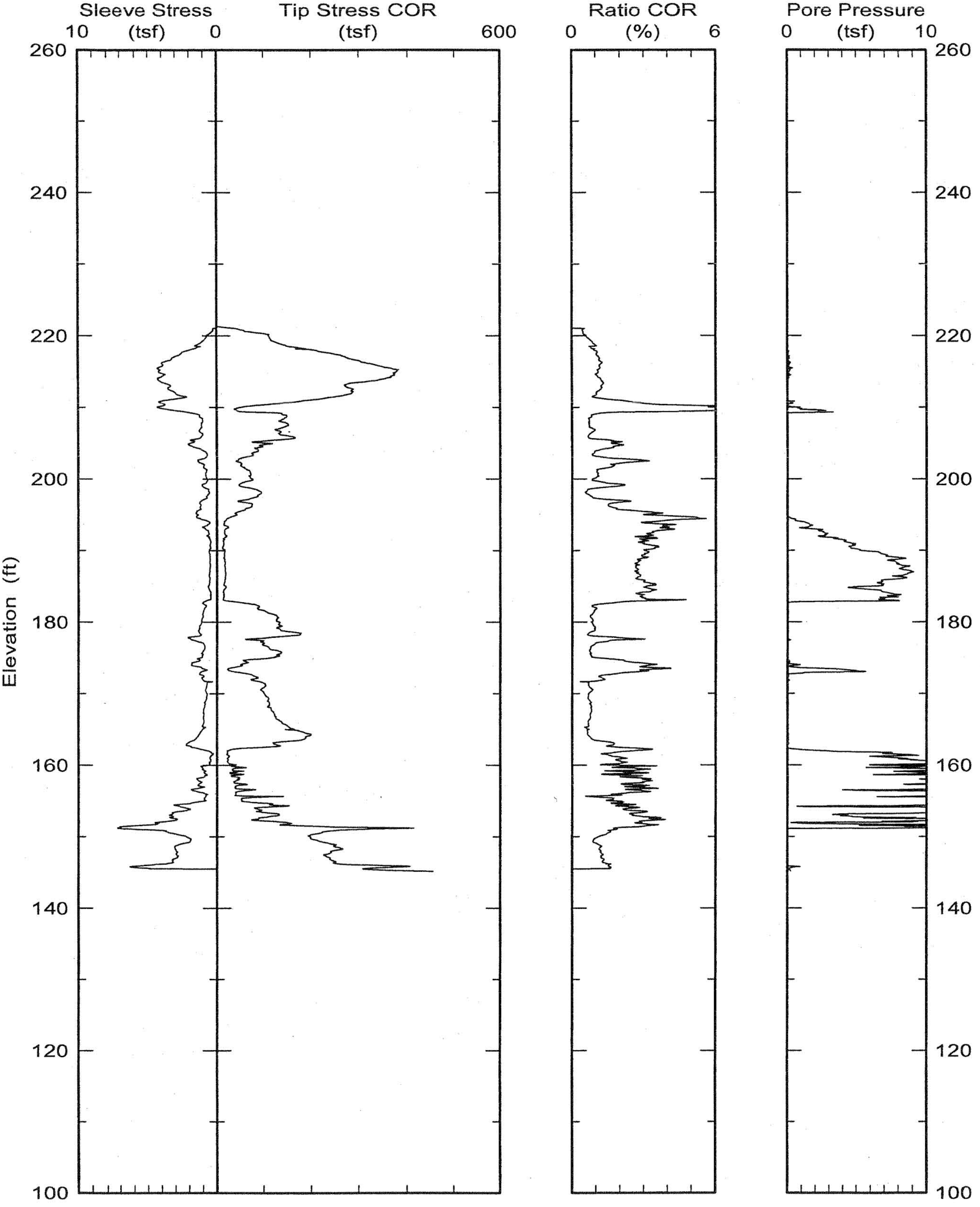
Maximum depth: 81.62 **(R)**

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1008

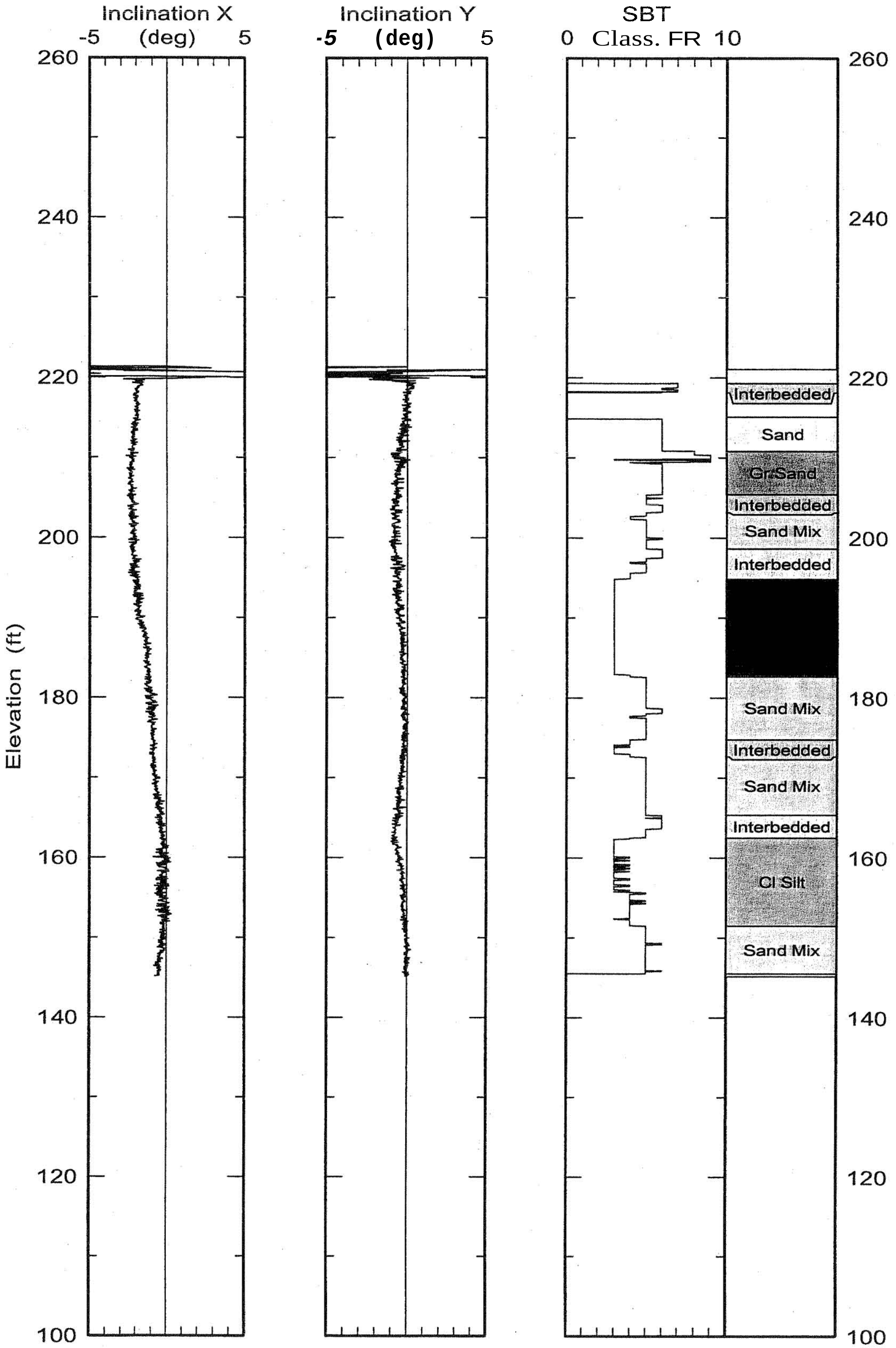
Northing: 8268.48
Easting: 6930.89
Elevation: 221.30



Maximum depth: 76.14 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 02/Sep/2005
Test ID: C-1008
Northing: 8268.48
Easting: 6930.89
Elevation: 221.30



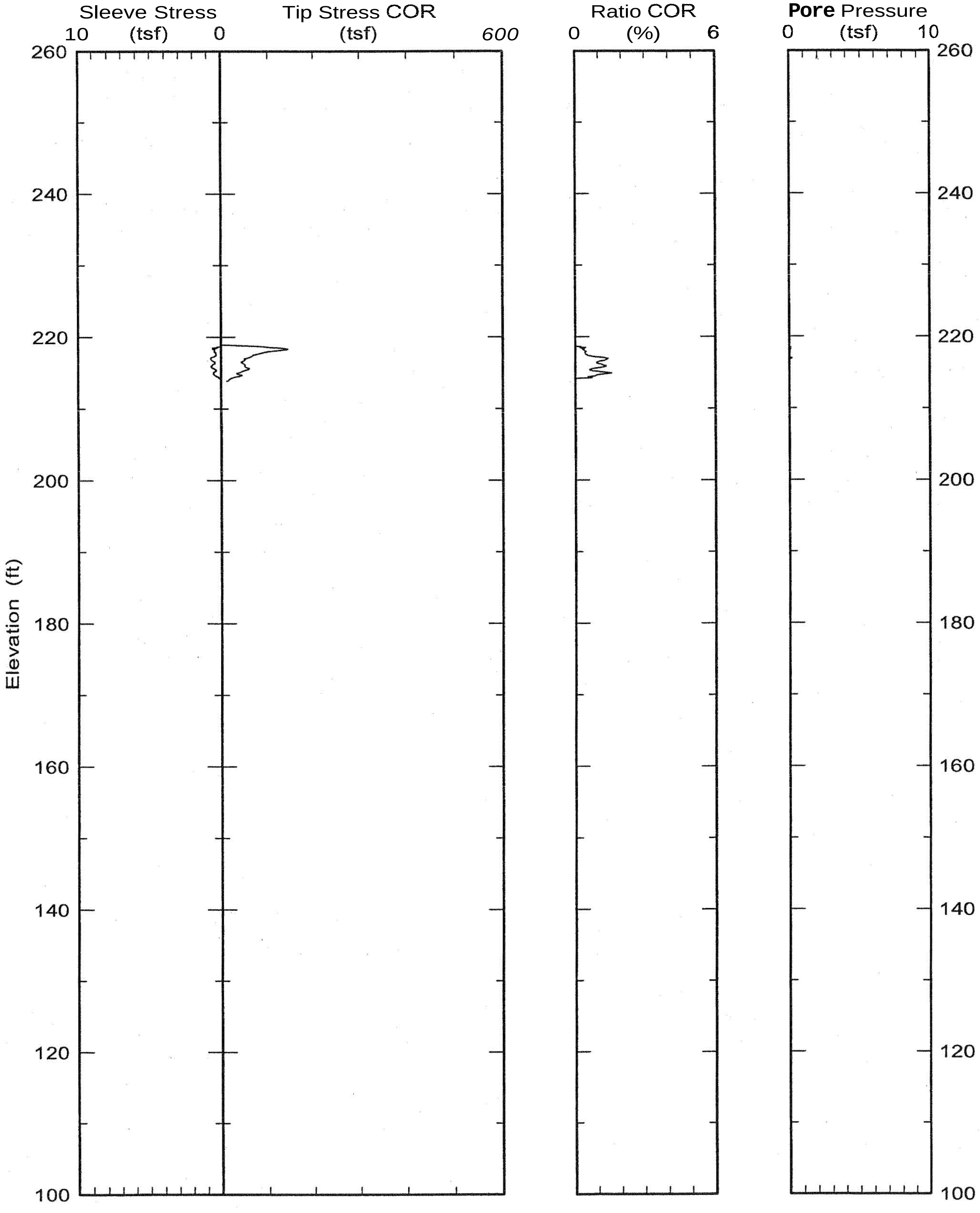
Maximum depth: 76.14 (ft)

Class FR: Friction Ratio Clas

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 07/Sep/2005
Test ID: C-1009

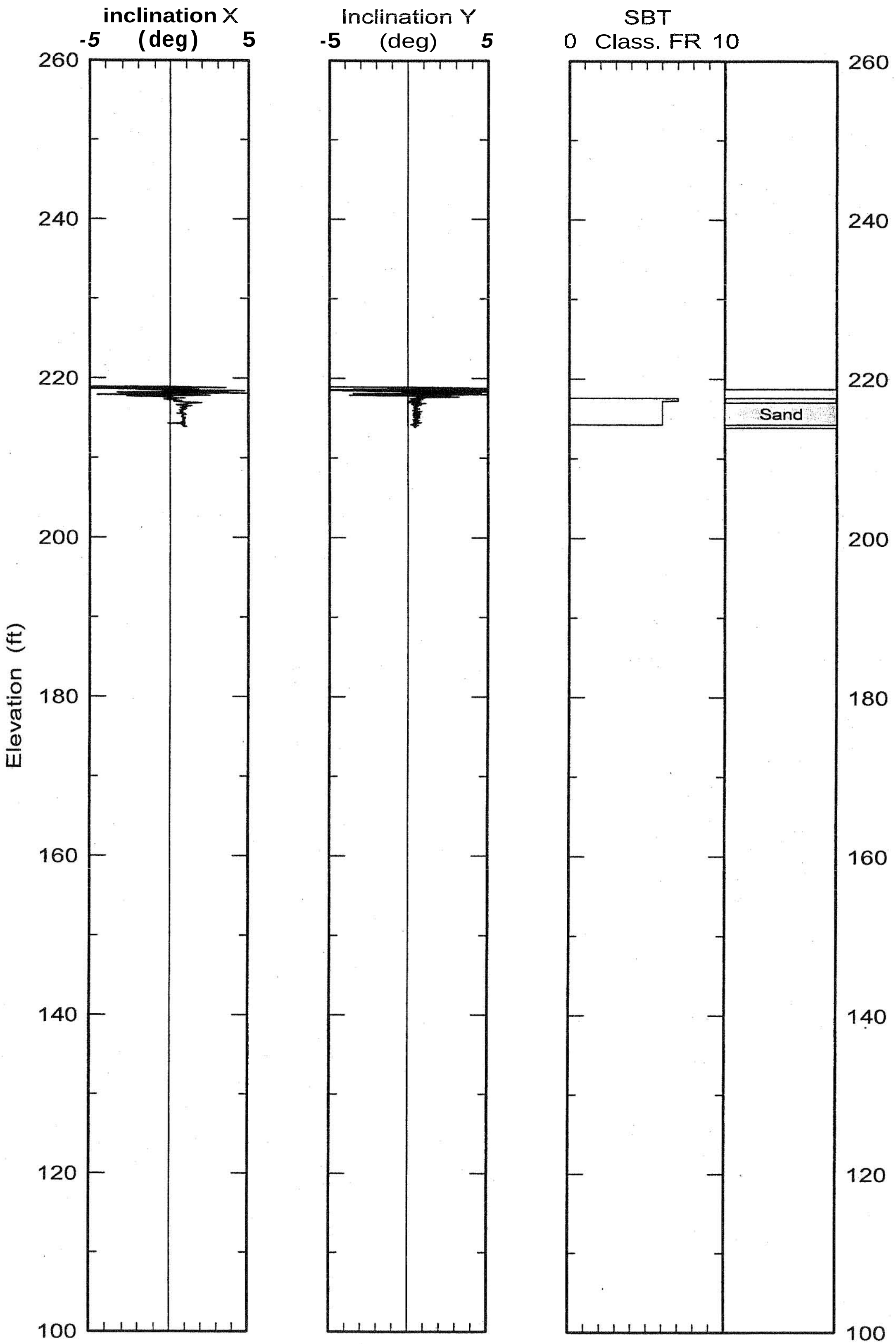
Northing: 5979.62
Easting: 6798.49
Elevation: 218.93



Maximum depth: 5.09 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 07/Sep/2005
Test ID: C-1009
Northing: 5979.62
Easting: 6798.49
Elevation: 218.93



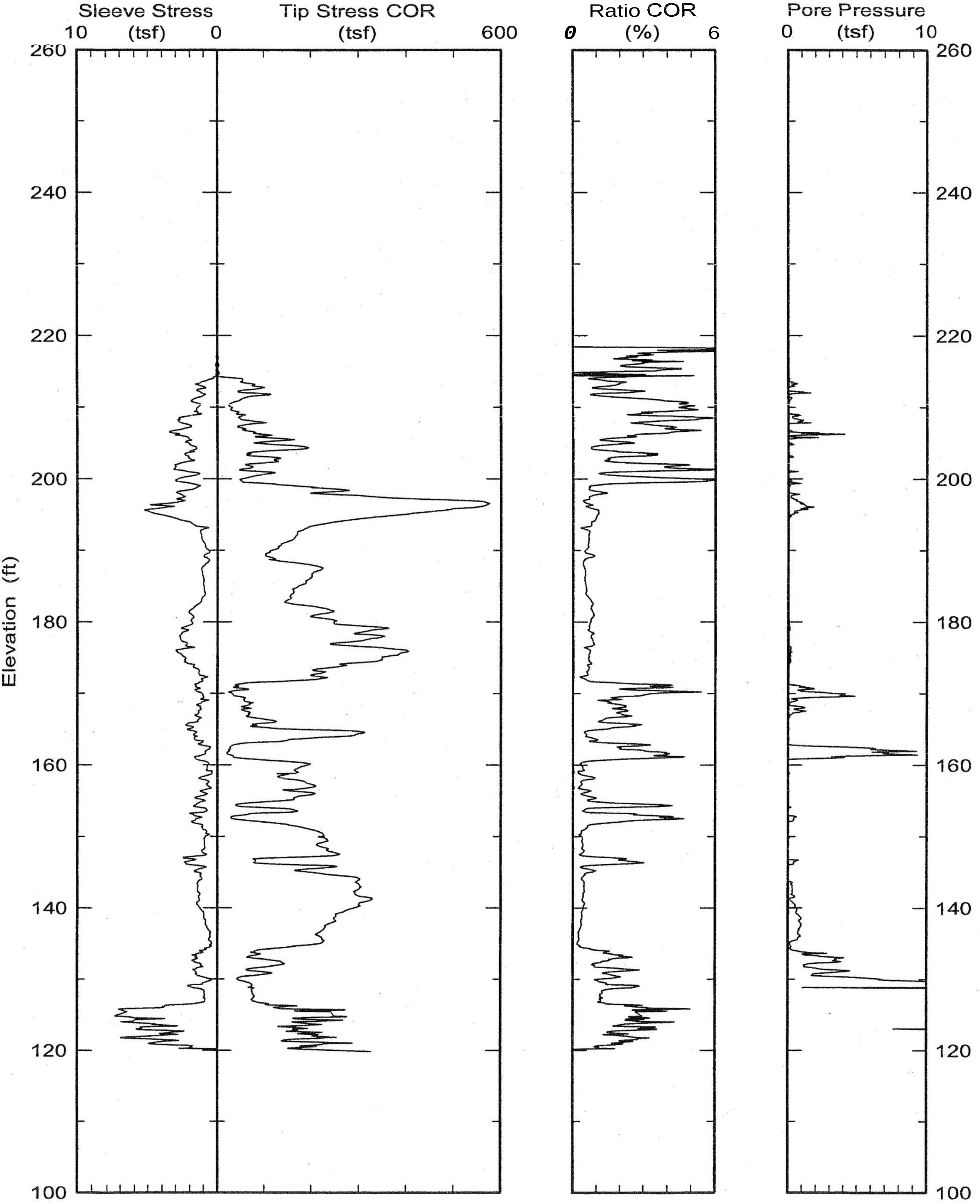
Maximum depth: 5.09 (ft)

Class FR: Friction **Ratio** Clas

Tad ID: C-1009

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 07/Sep/2005
Test ID: C-1009A
Northing: 5979.62
Easting: 6798.49
Elevation: 218.93

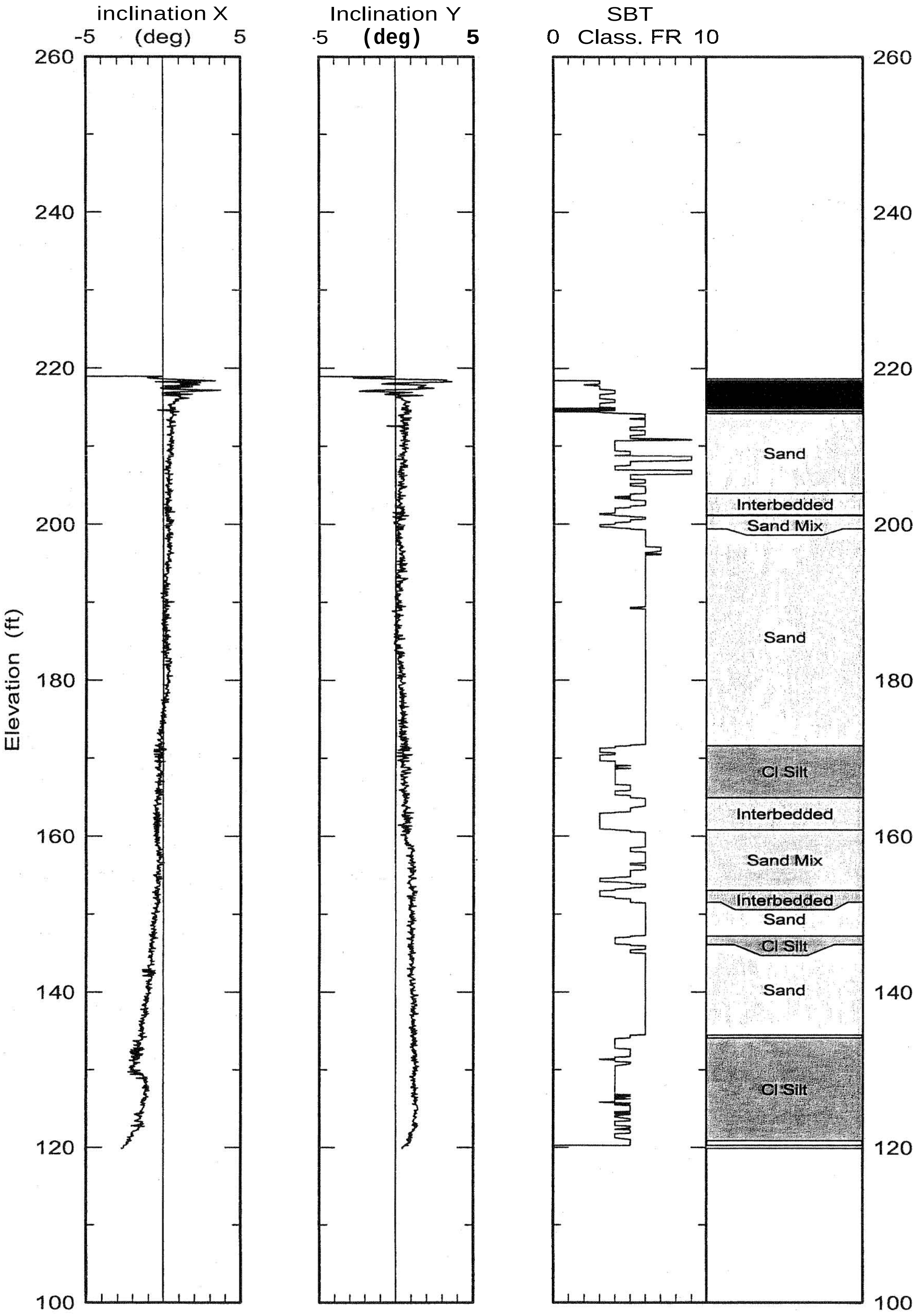


Maximum depth: 99.08 (ft)

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 07/Sep/2005
Test ID: C-1009A

Northing: 5979.62
Easting: 6798.49
Elevation: 218.93



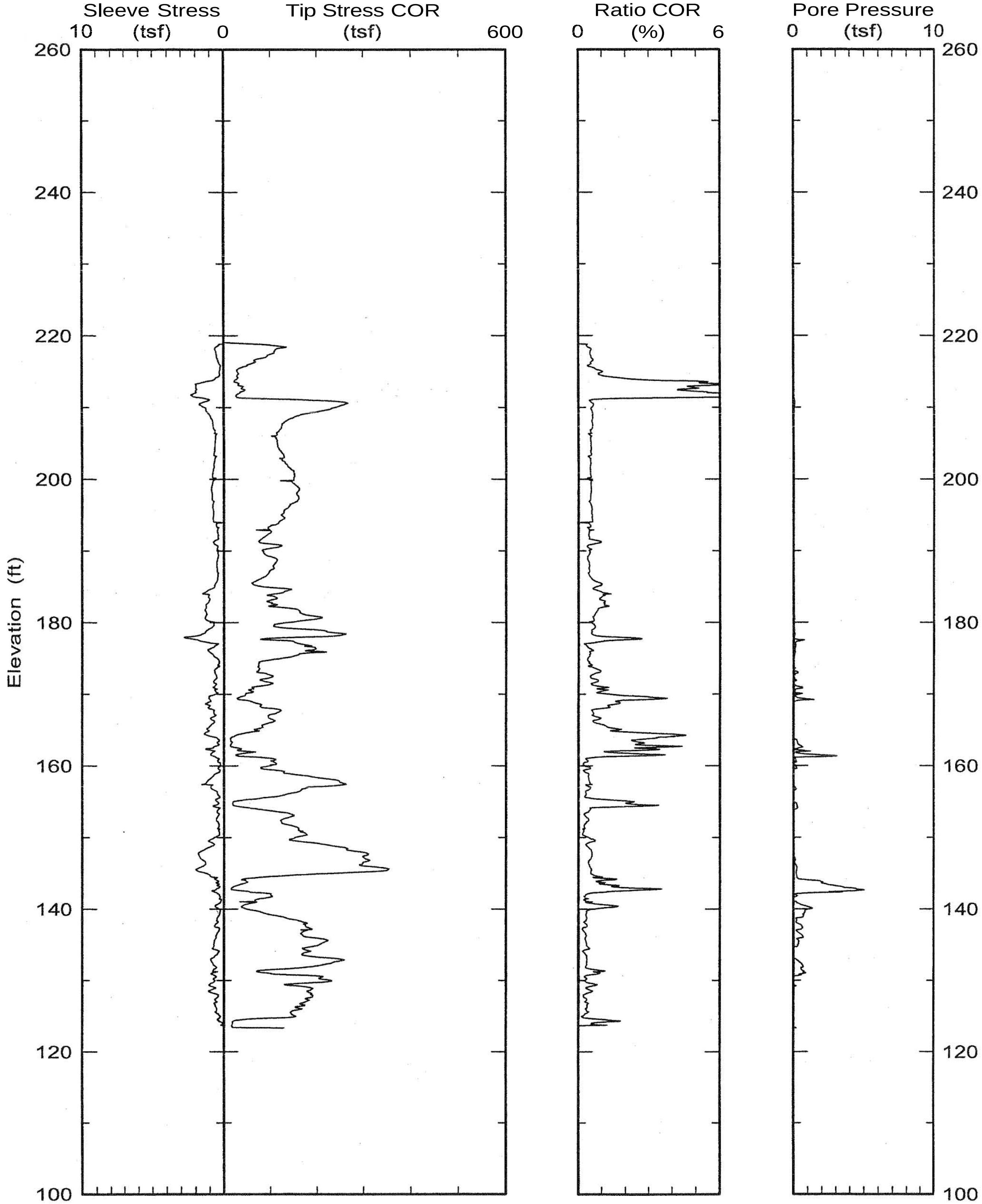
Maximum depth: 99.08 (ft)

Class FR: Friction Ratio Clas

Test ID: C-1009A
File: 207S0505C.ECP

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 08/Sep/2005
Test ID: C-1010
Northing: 6008.34
Easting: 7754.15
Elevation: 219.06

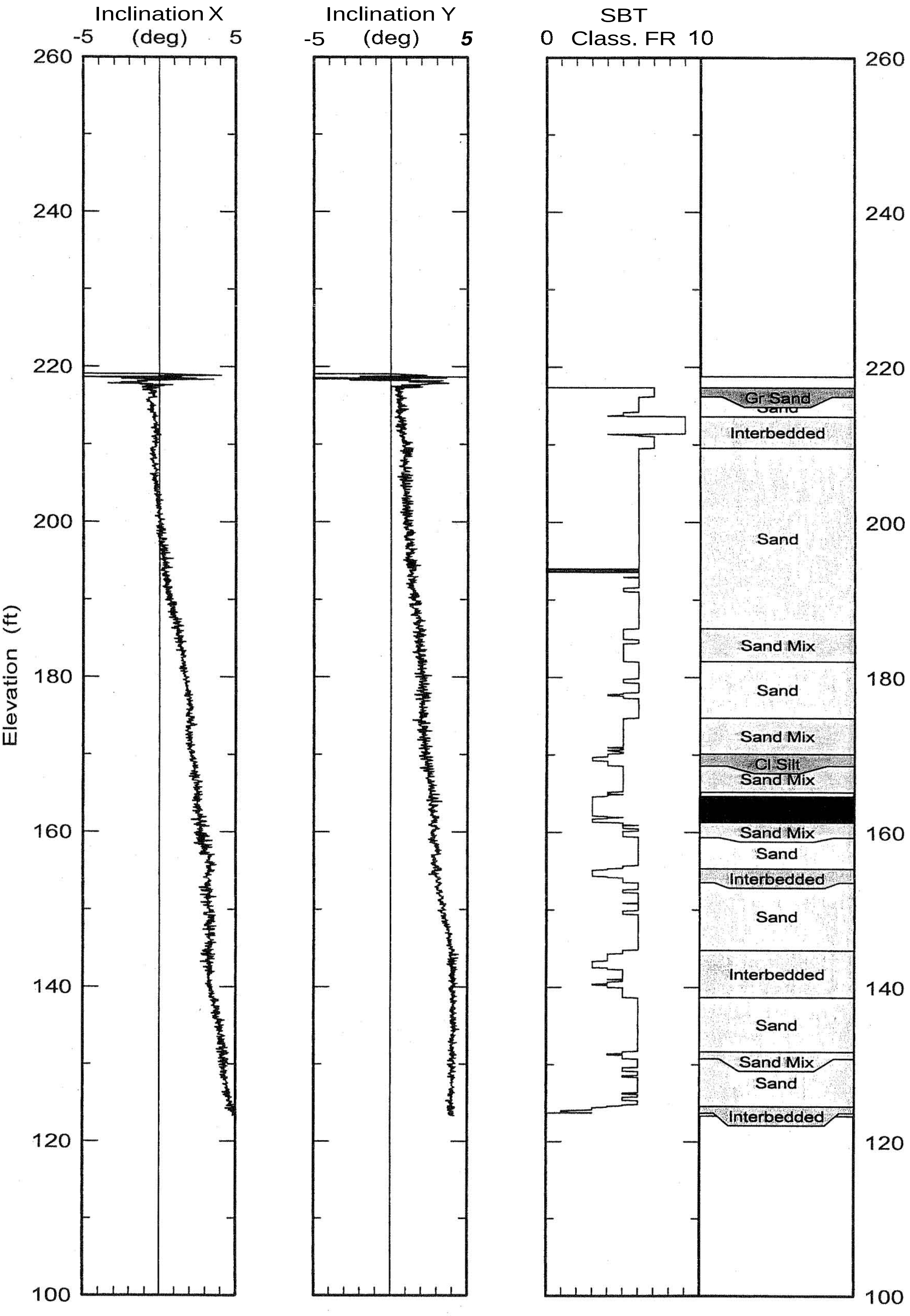


Maximum depth: 95.74 **(R)**

Applied Research Associates, Inc.
South Royalton, VT 05068
802-763-8348
cpt@ned.ara.com
www.ara.com

Date: 08/Sep/2005
Test ID: C-1010

Northing: 6008.34
Easting: 7754.15
Elevation: 219.06



Maximum depth: 95.74 **(R)**

Class FR: Friction Ratio Clas

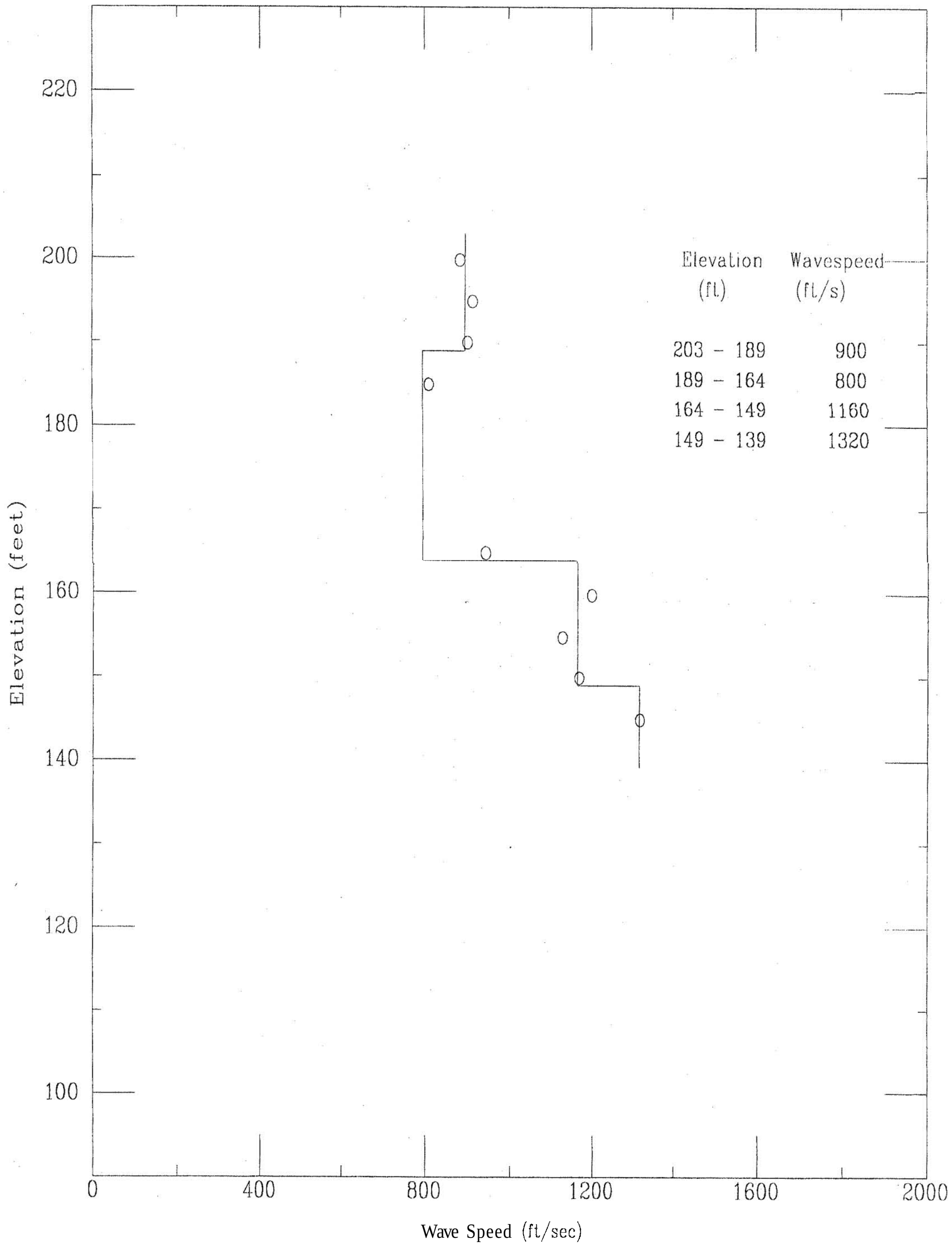
Test ID: C-1010
File: 208S0502C.ECP

APPENDIX B

SEISMIC DATA

C-**1003** **APPLIED** RESEARCH **ASSOCIATES,** INC. 07/Sep/2005

Shear Wave Speeds

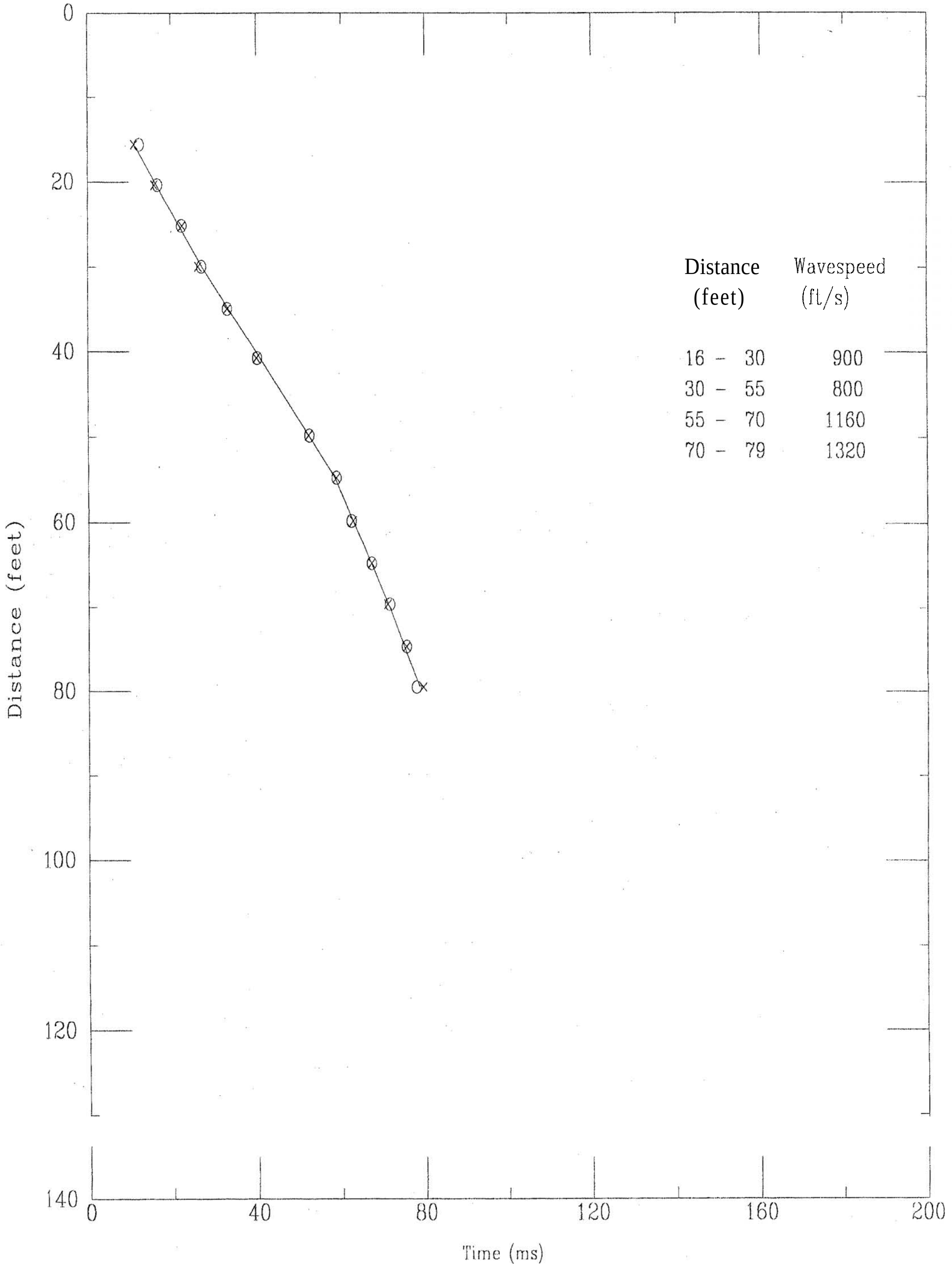


Elevation (ft)	Wavespeed (ft/s)
203 - 189	900
189 - 164	800
164 - 149	1160
149 - 139	1320

File 207s0506

C-1003 APPLIED RESEARCH ASSOCIATES, INC. 07/Sep/2005

Shear Wave Time of Peak

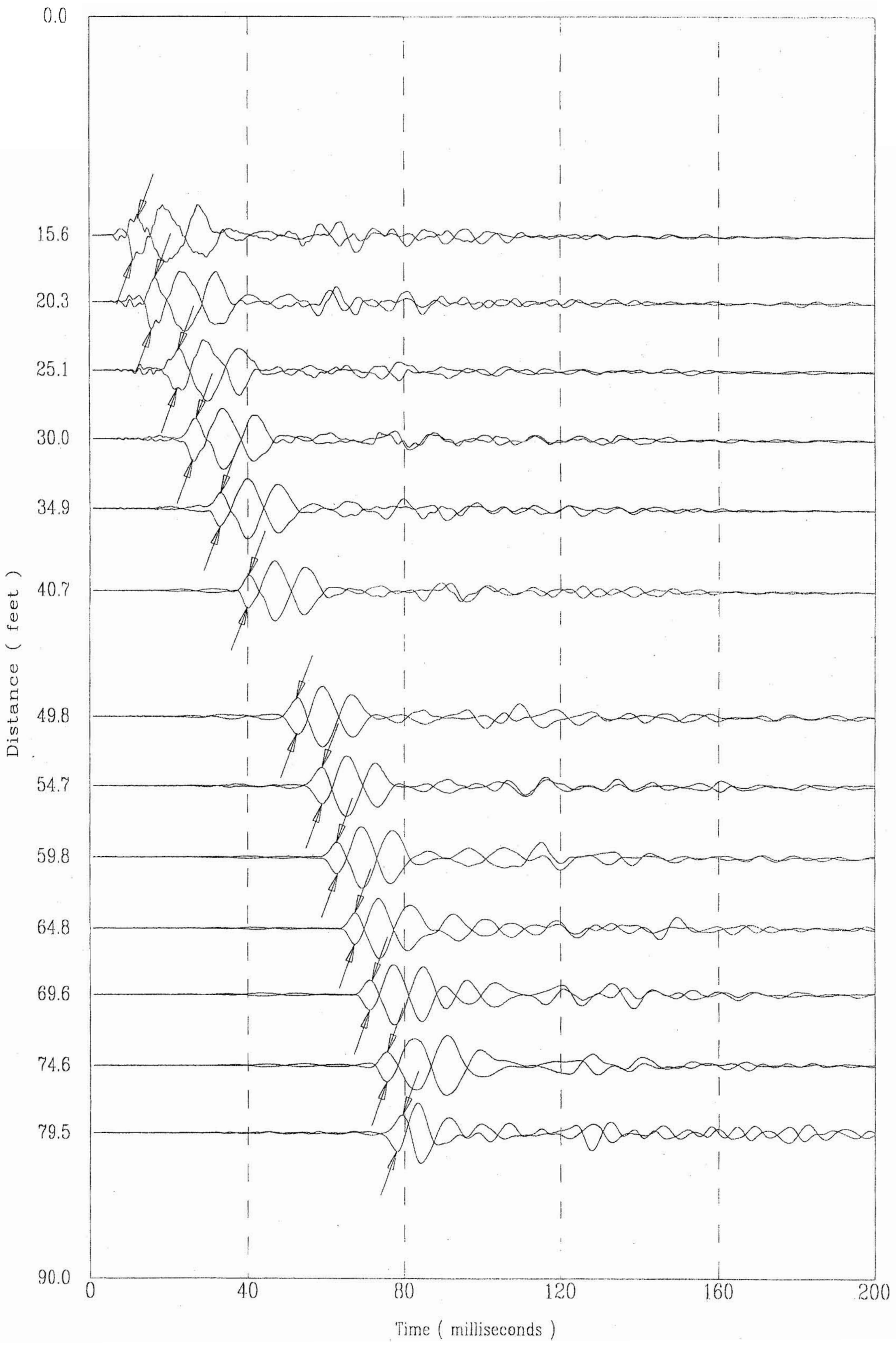


Distance (feet)	Wavespeed (ft/s)
16 - 30	900
30 - 55	800
55 - 70	1160
70 - 79	1320

File 207s0506

Applied Research Associates, Inc.
C-1003

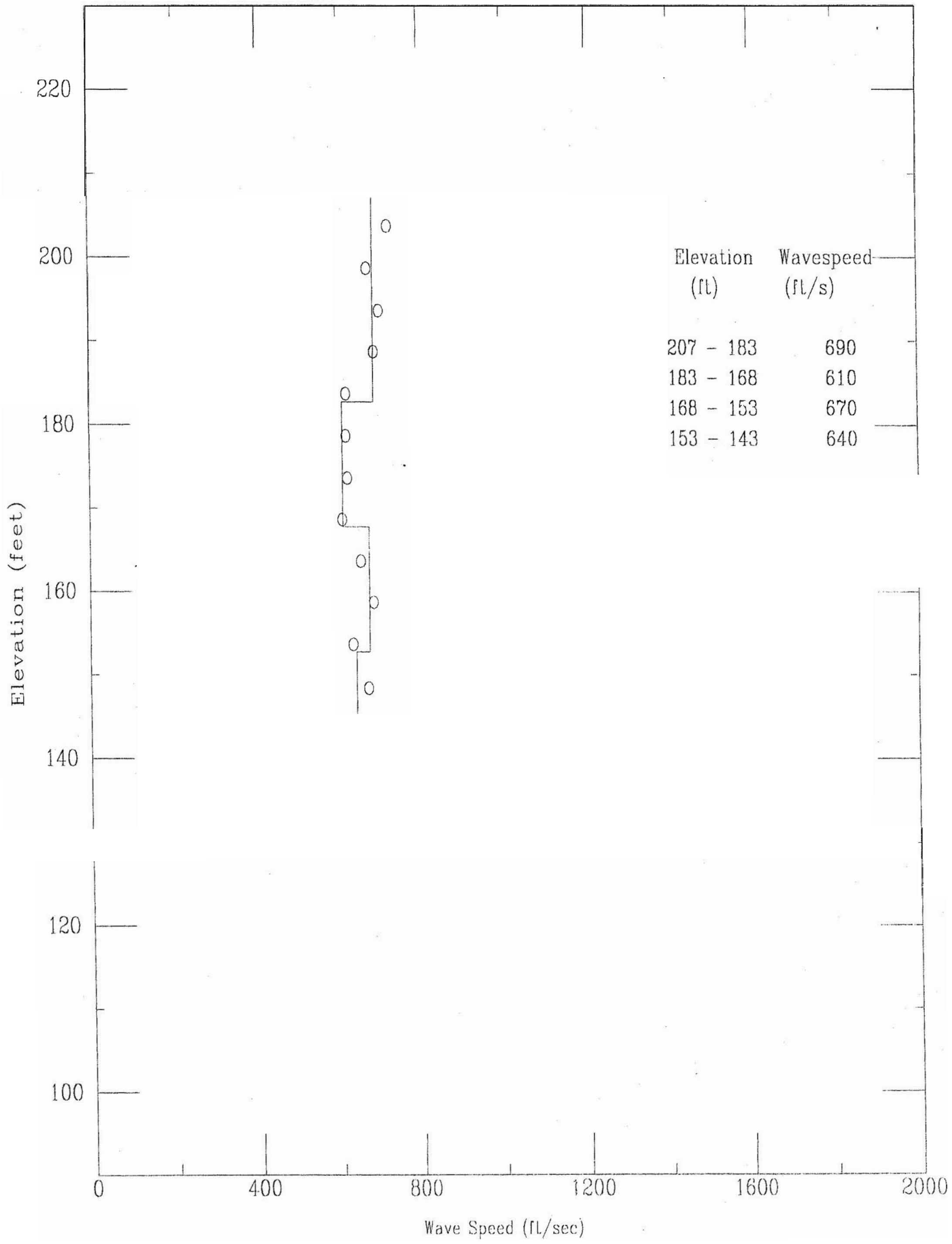
S Wave
07/Sep/2005



File 207s0506

C- 1005 APPLIED RESEARCH ASSOCIATES, INC 08/Sep/2005

Shear Wave Speeds

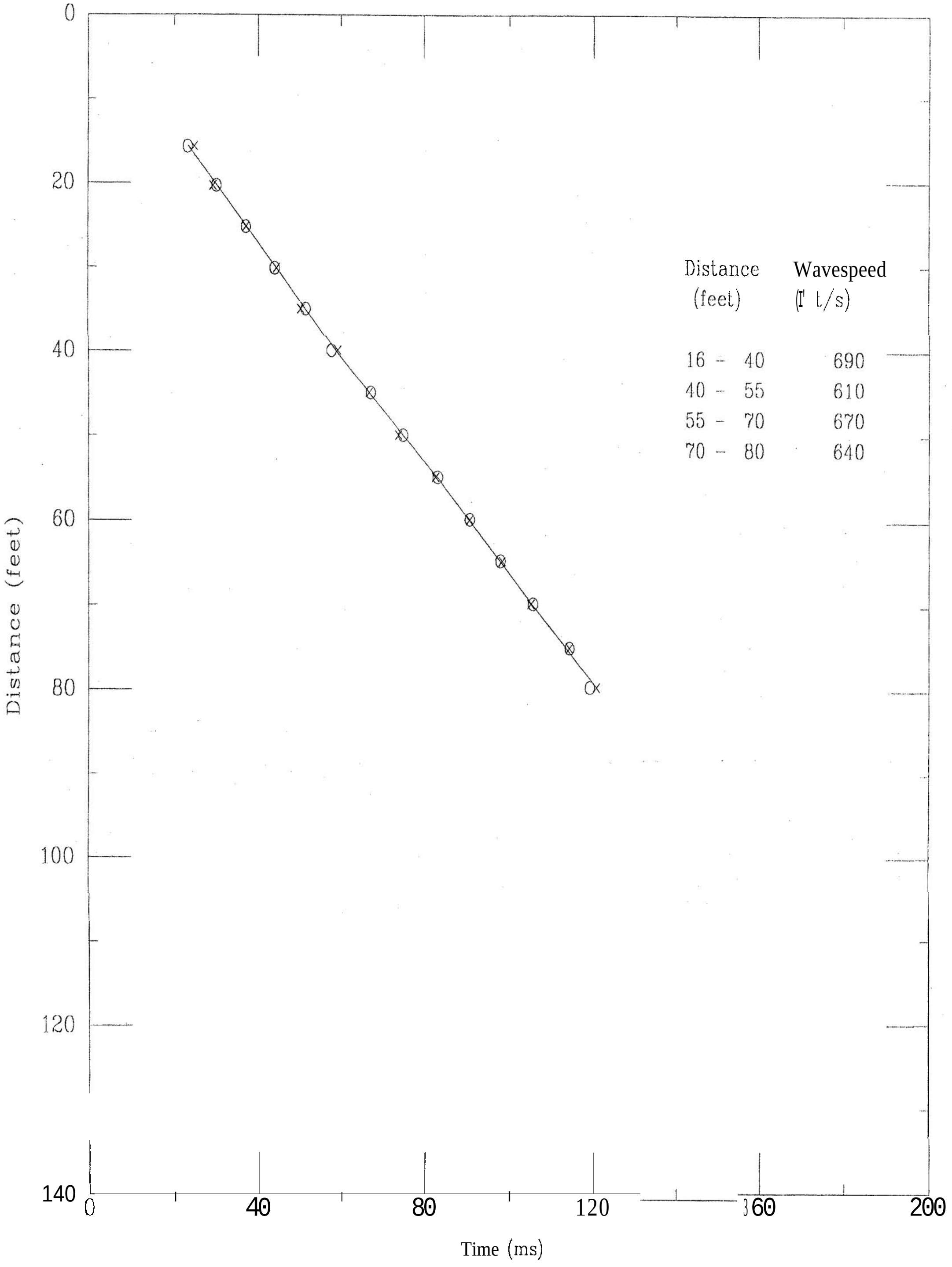


Elevation (ft)	Wavespeed (ft/s)
207 - 183	690
183 - 168	610
168 - 153	670
153 - 143	640

File 208s0501

C-1005 APPLIED RESEARCH ASSOCIATES, INC. 08/Sep/2005

Shear Wave Time of Peak

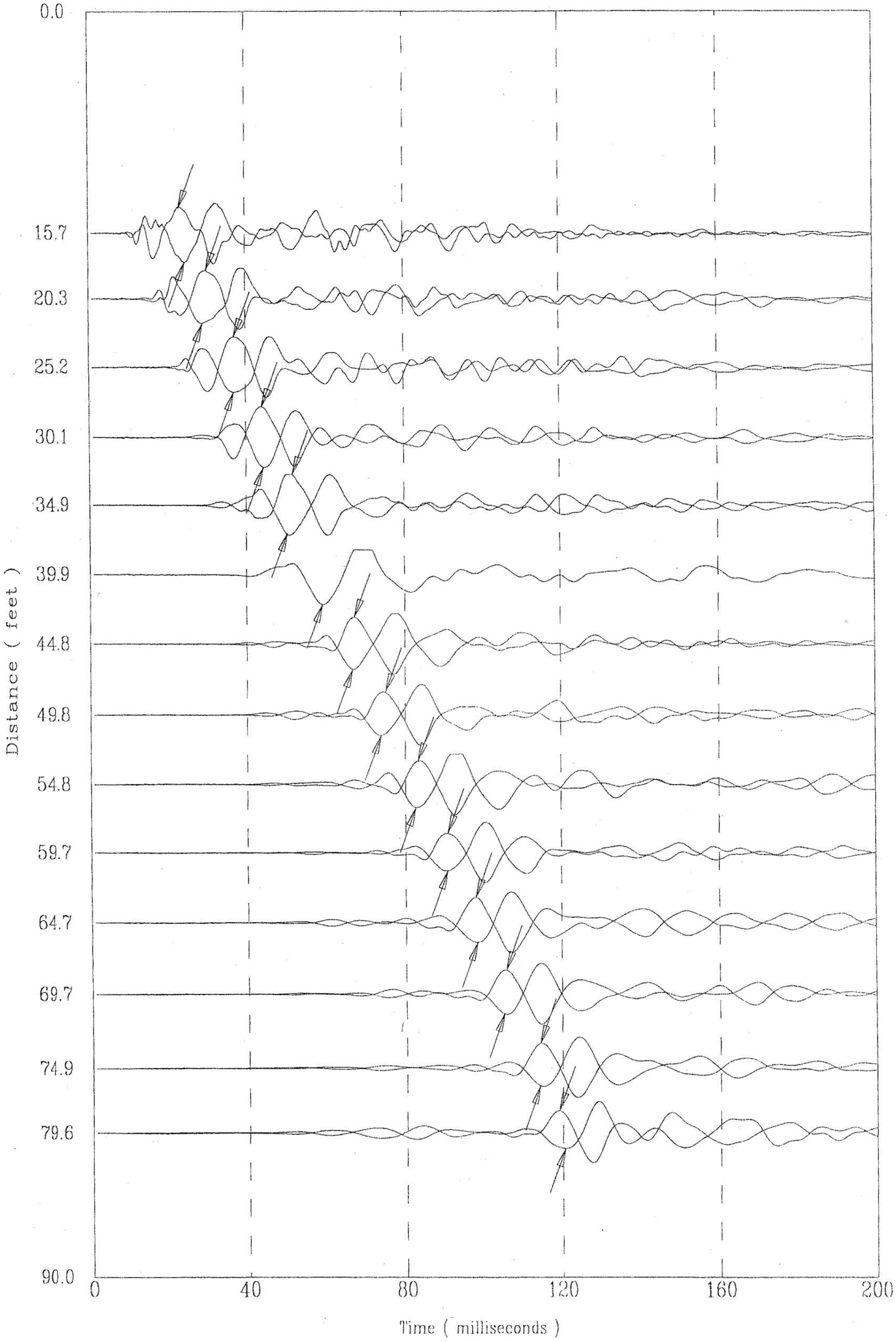


Distance (feet)	Wavespeed (ft/s)
16 - 40	690
40 - 55	610
55 - 70	670
70 - 80	640

File 208s0501

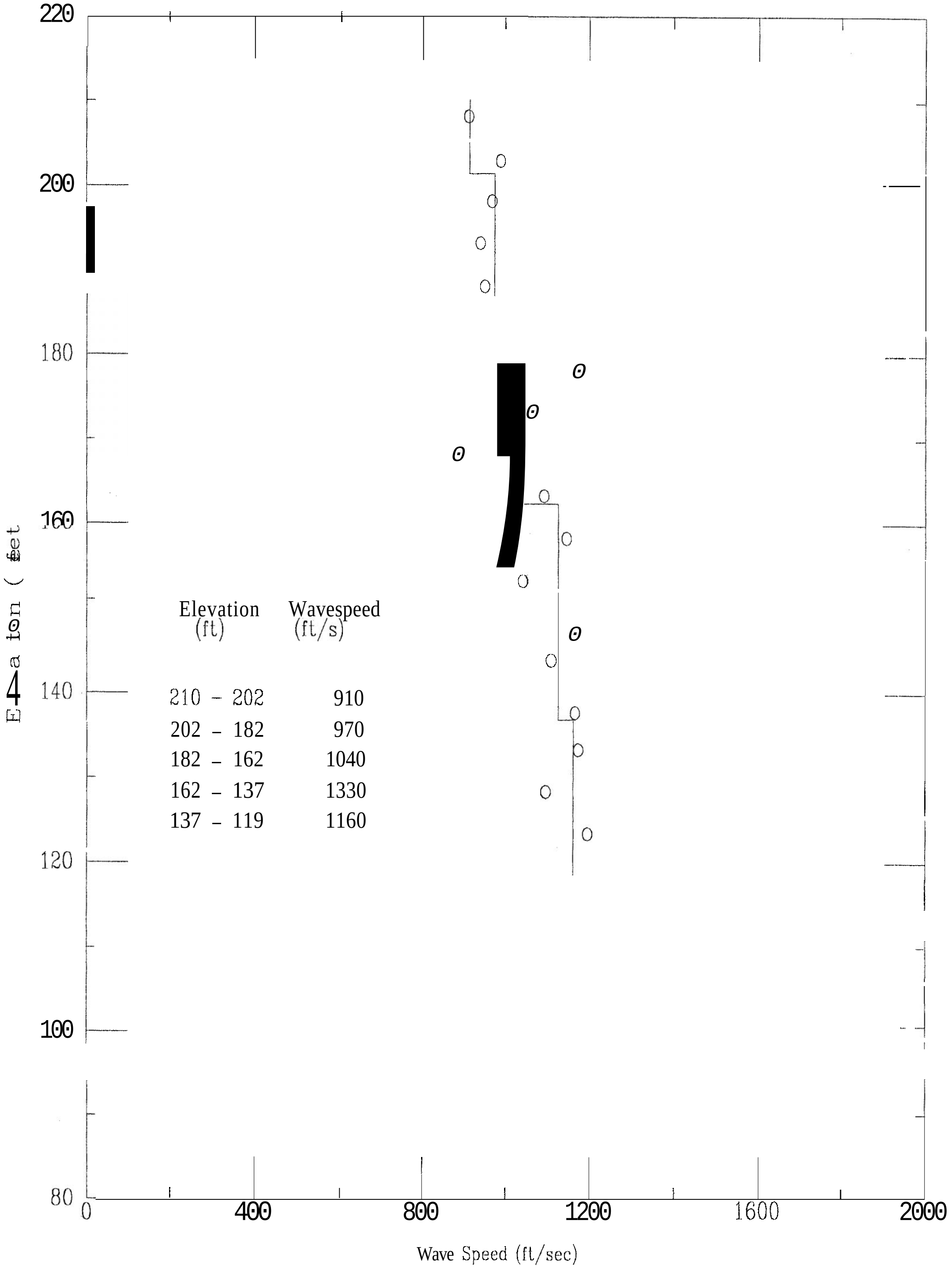
Applied Research Associales, Inc.
C-1005

S Wave
08/Sep/2005



208s0501

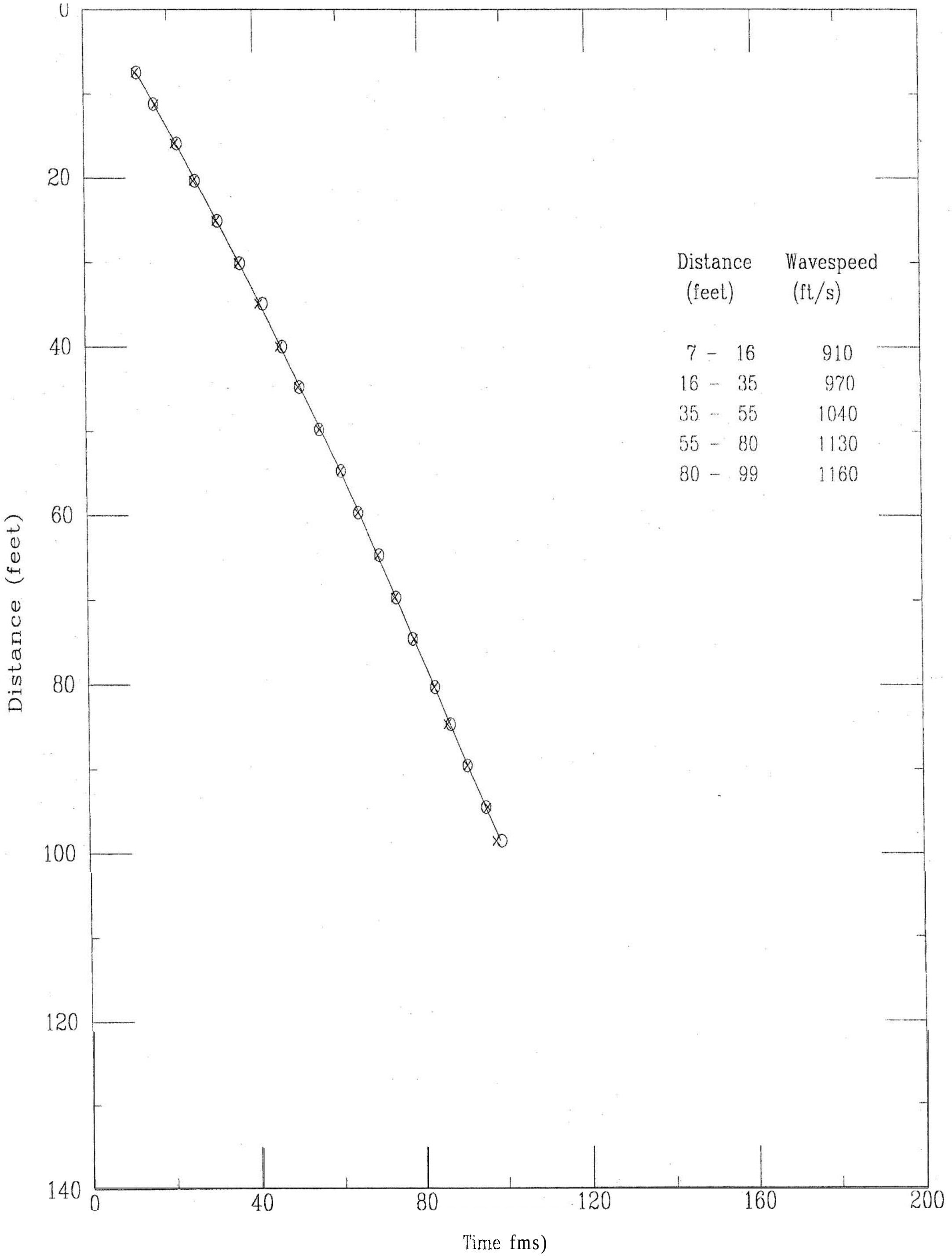
Shear Wave Speeds



Elevation (ft)	Wavespeed (ft/s)
210 - 202	910
202 - 182	970
182 - 162	1040
162 - 137	1330
137 - 119	1160

C-1009 APPLIED RESEARCH ASSOCIATES, INC. 07/Sep/2005

Shear Wave Time of Peak

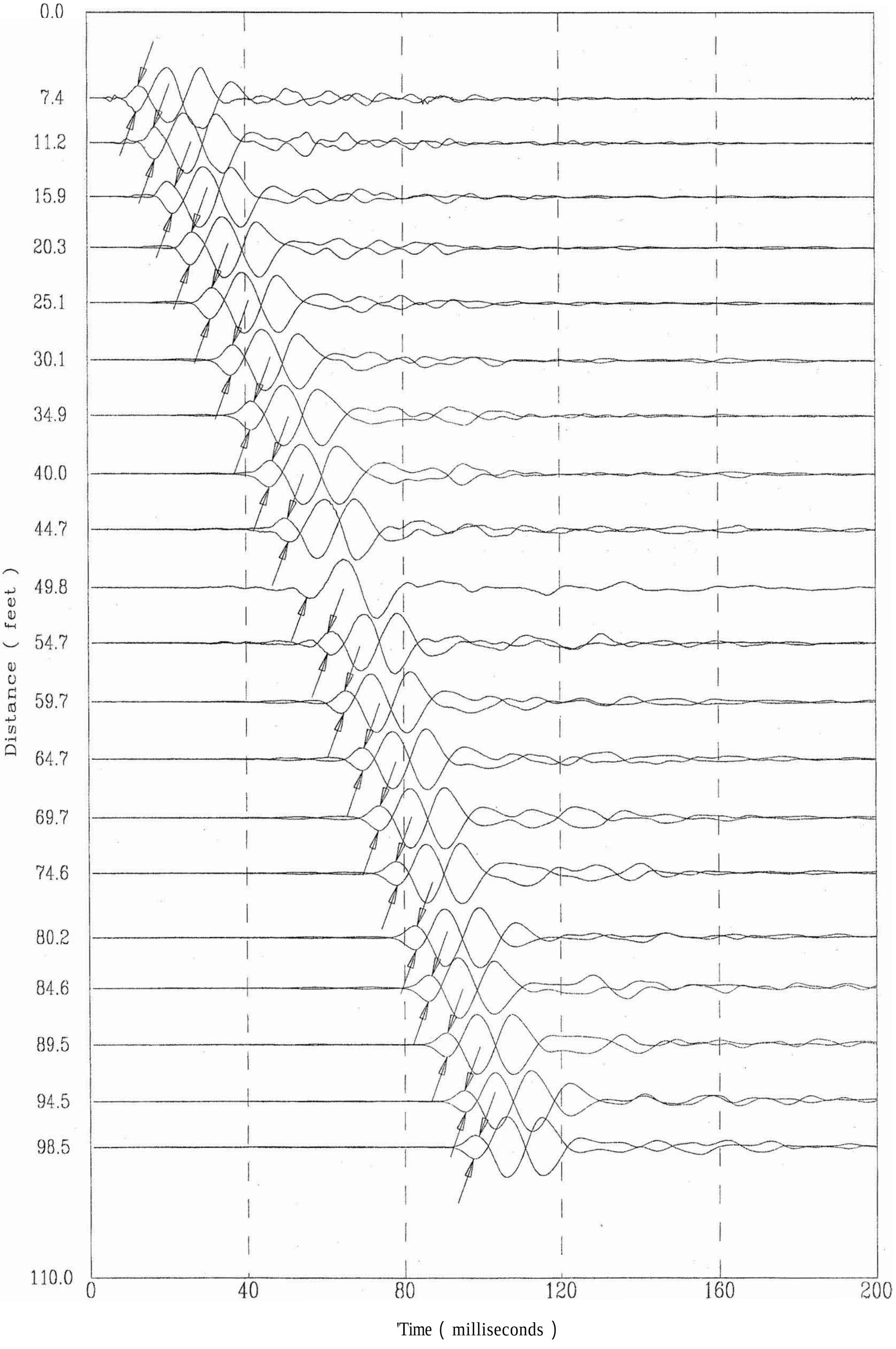


Distance (feet)	Wavespeed (ft/s)
7 - 16	910
16 - 35	970
35 - 55	1040
55 - 80	1130
80 - 99	1160

File 207s0505

Applied Research Associates, Inc.
C-1009

S Wave
07/Sep/2005



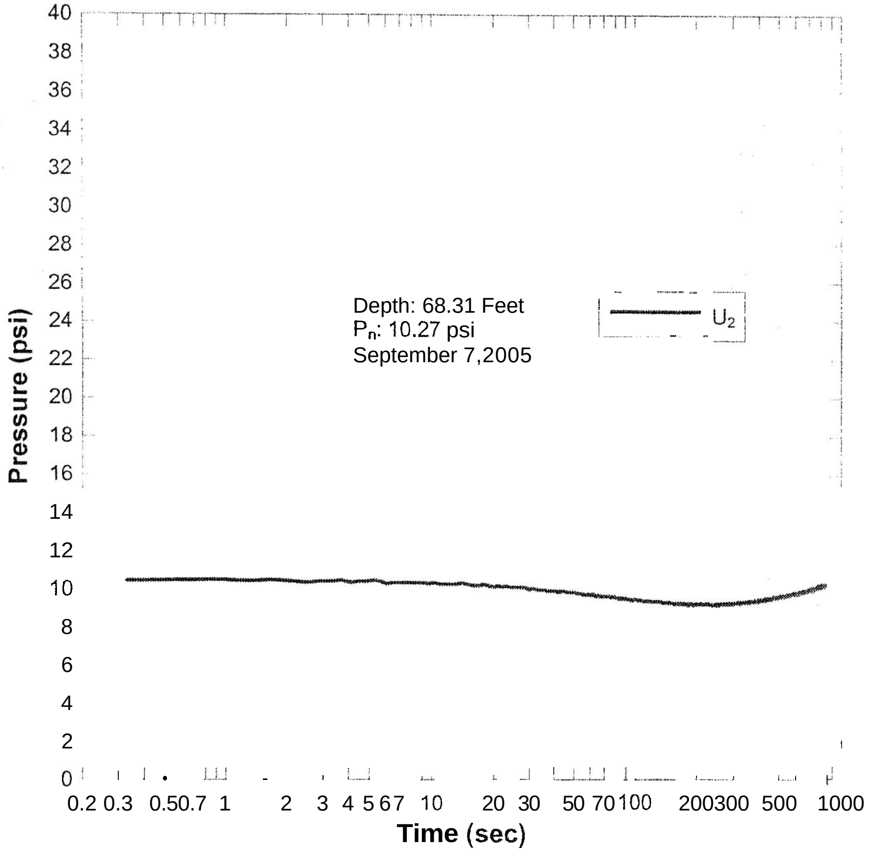
File 207s0505

APPENDIX C

PORE PRESSURE DISSIPATION DATA

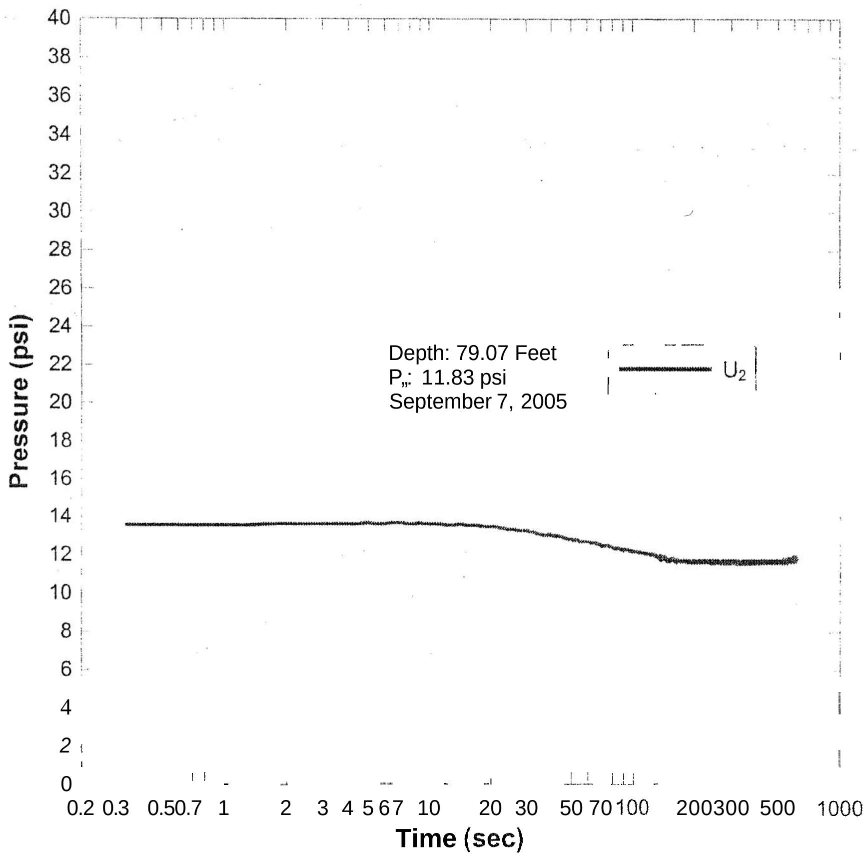
MACTEC C-1003

Applied Research Associates, inc. 207S0506D.68



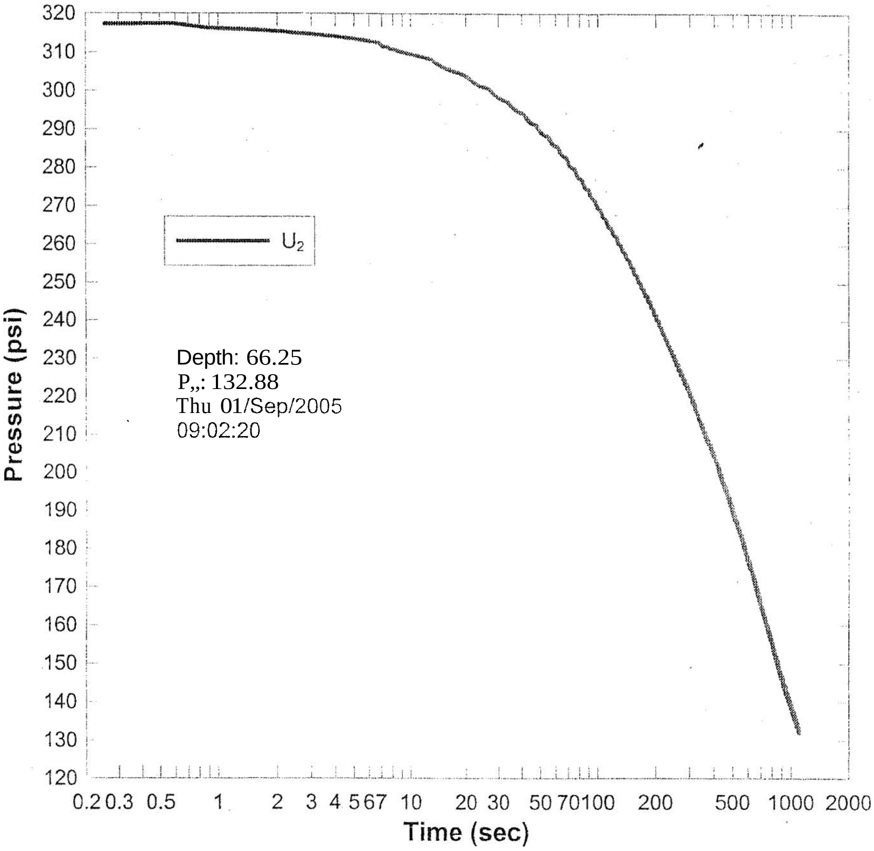
MACTEC C-1003

Applied Research Associates, inc. 207S0506D.79



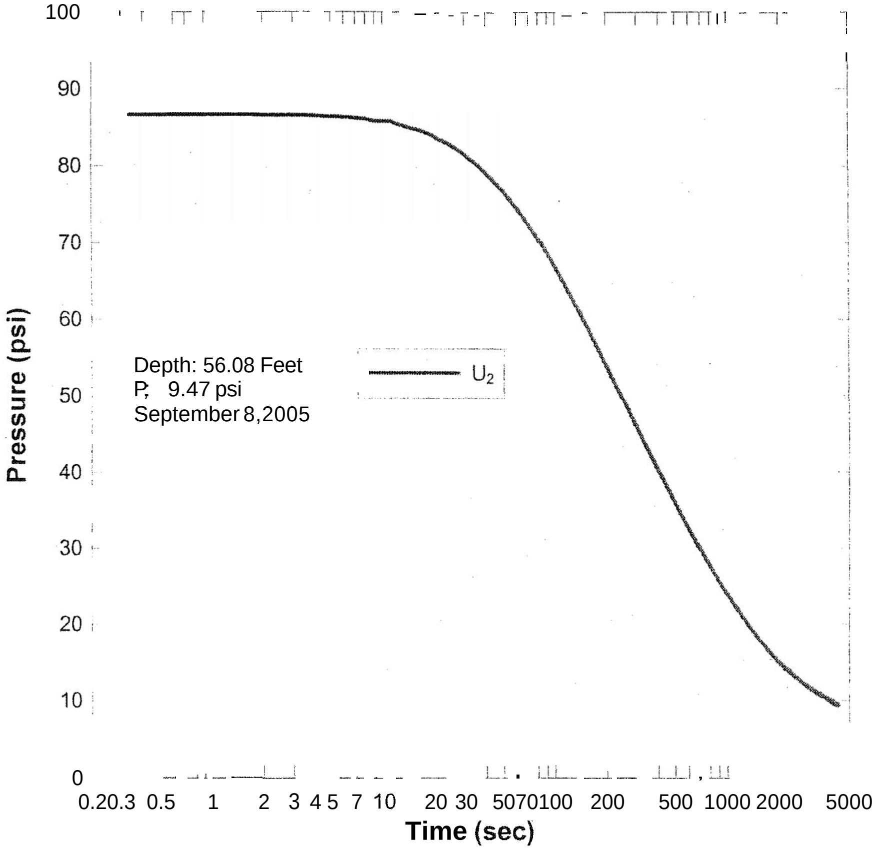
MACTEC C-1004

Applied Research Associates, Inc. 201S0501D.66



MACTEC C-1005

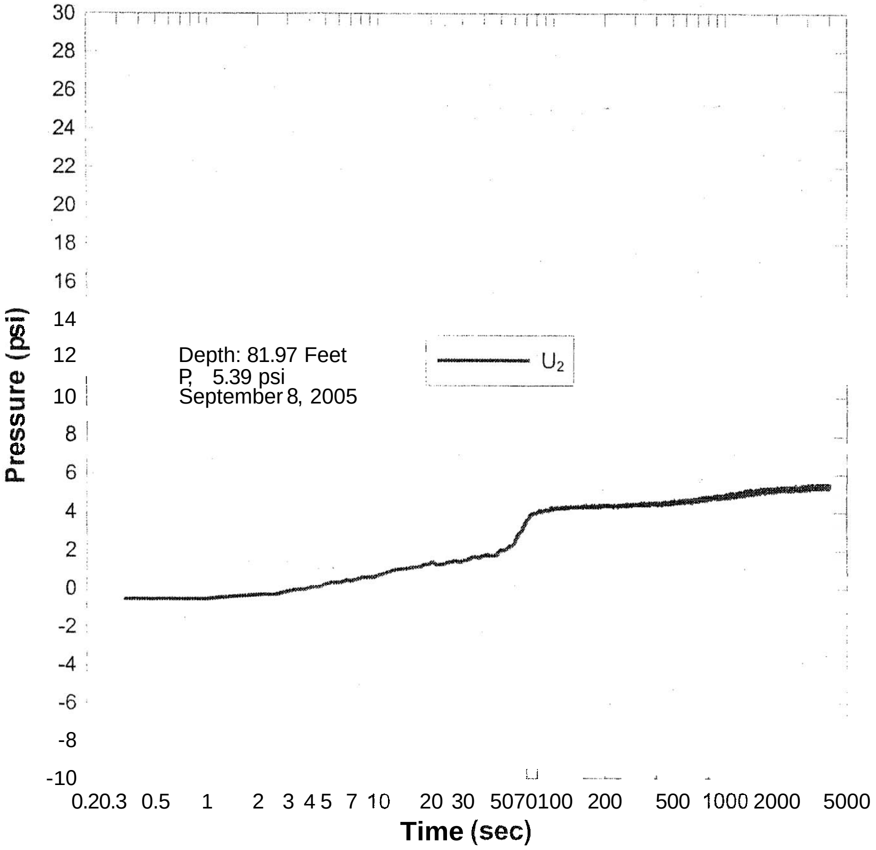
Applied Research Associates, Inc. 208S0501D.56



Depth: 56.08 Feet
P, 9.47 psi
September 8,2005

MACTEC C-1005

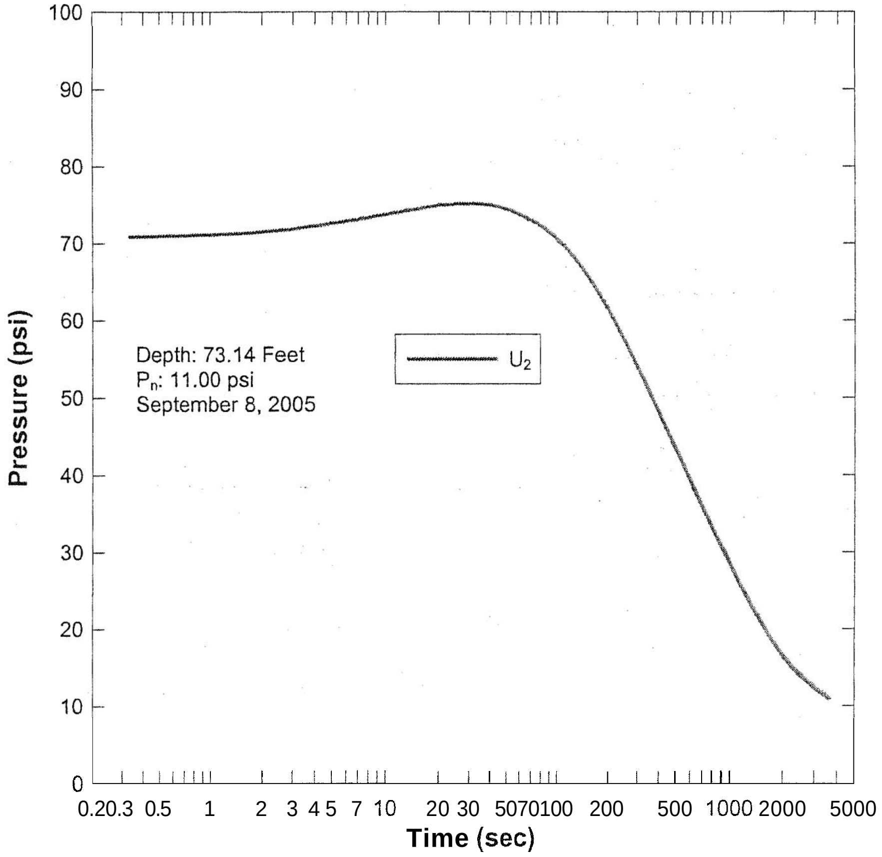
Applied Research Associates, Inc. 208S0501D.82



Depth: 81.97 Feet
P, 5.39 psi
September 8, 2005

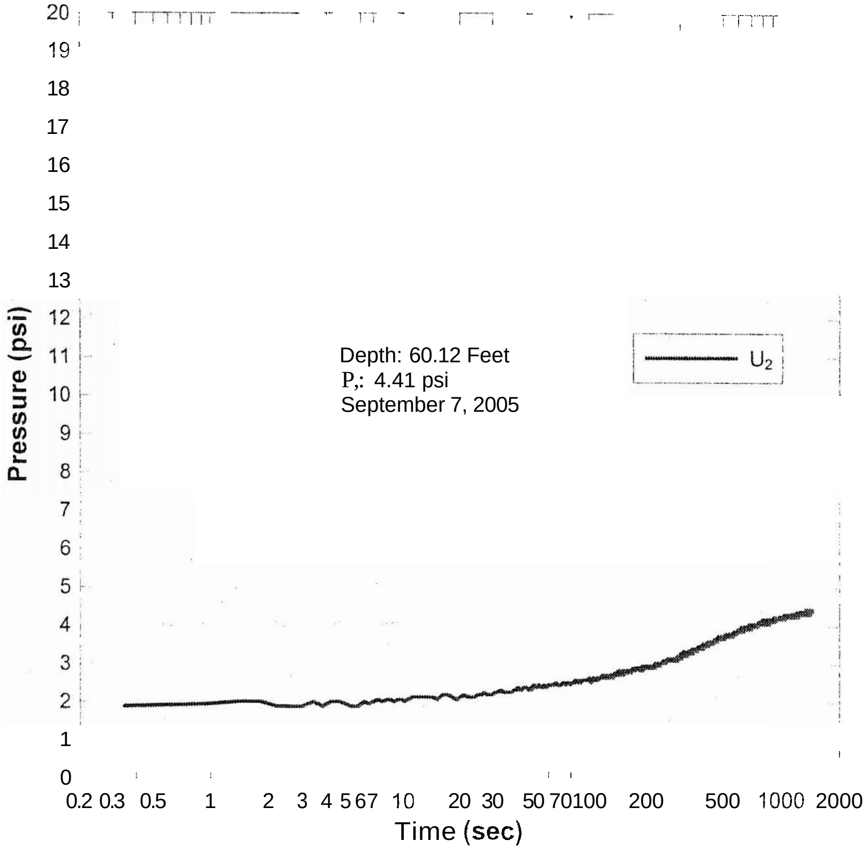
MACTEC **C-1005**

Applied Research Associates, Inc. 208S0501D.73



MACTEC C-1009

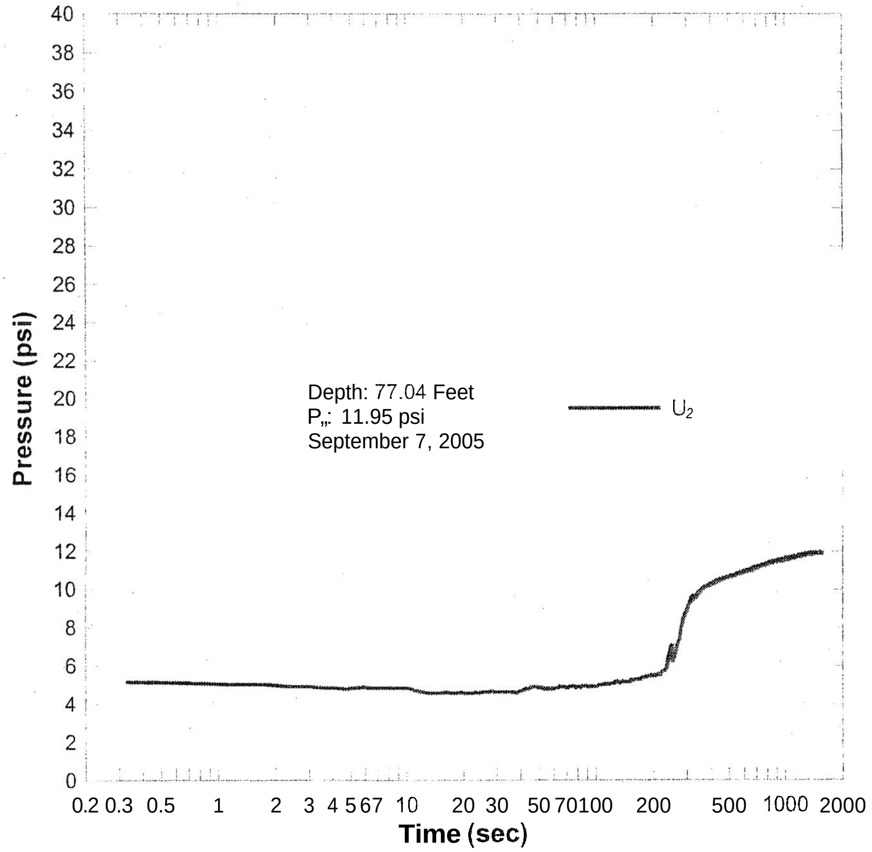
Applied Research Associates, Inc. 207S0505D.60



Depth: 60.12 Feet
P,: 4.41 psi
September 7, 2005

MACTEC C-1009

Applied Research Associates, Inc. 207S0505D.77



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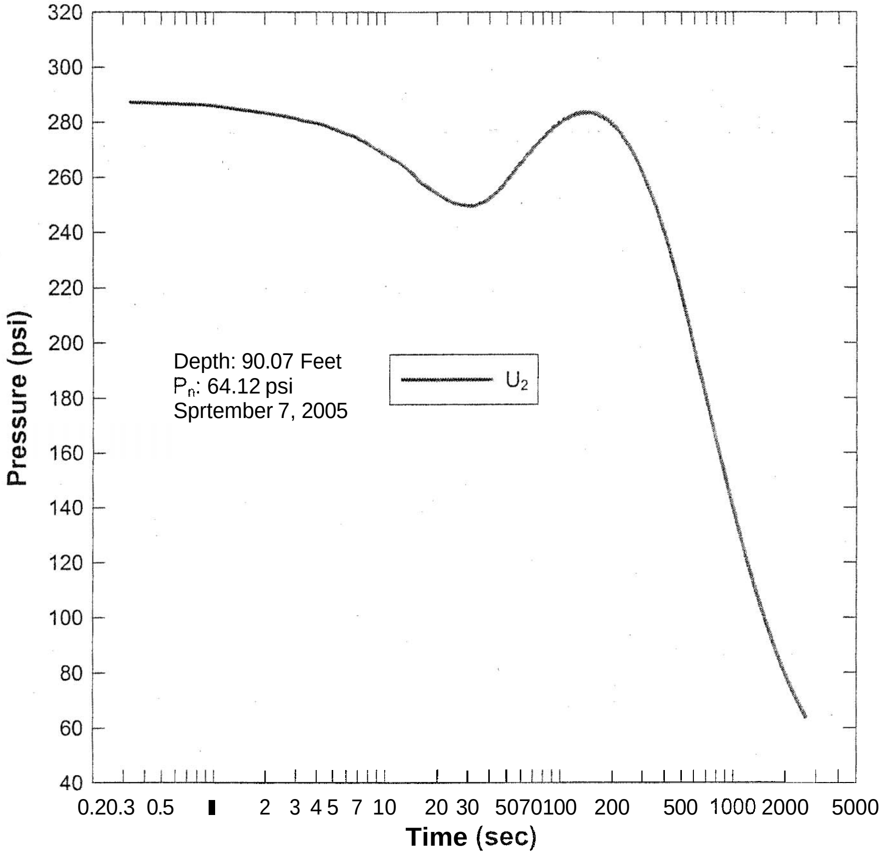

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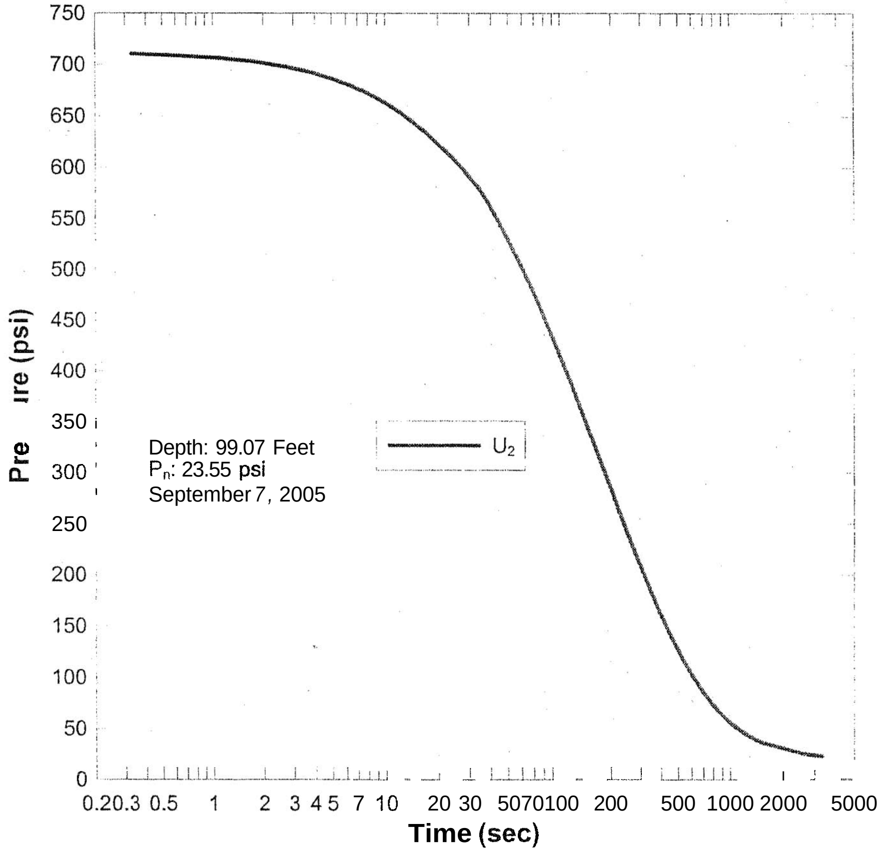

MACTEC

APPENDIX C

REPORT OF
BOREHOLE GEOPHYSICS
By GEOVISION Geophysical Services

VOGTLE ELECTRIC GENERATING PLANT,
BOREHOLES B-1002, B-1002A,
B-1003, B-1004 AND C-1005A
BOREHOLE GEOPHYSICS

December 19, 2005
Report 5492-01 rev a
Volume 4 of 2 *

* NOTE: VOLUME 2 OF THIS REPORT IS A CDROM CONTAINING THIS REPORT WITH APPENDICES AND DATA IN ELECTRONIC FORMAT.

VOGTLE ELECTRIC GENERATING PLANT,
BOREHOLES B-1002, B-1002A,
B-1003, B-1004 AND C-1005A
BOREHOLE GEOPHYSICS

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December 19, 2005
Report 5492-01 rev a
Volume 1 of 2

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INTRODUCTION

Boring geophysical measurements were collected in five uncased borings located at the Vogtle Electric Generating Plant Advanced Light Water Reactor, located south of Augusta, Georgia. Suspension logging data acquisition was performed between September 22 and November 11, 2005 by Rob Steller of GEOVision. The work was performed under subcontract with MACTEC, Inc., with Matt Cooke serving as the point of contact for MACTEC.

This report describes the field measurements, data analysis, and results of this work.

SCOPE OF WORK

This report presents the results of boring geophysical measurements collected between September 22 and November 11, 2005, in five uncased borings, as detailed below. The purpose of these studies was to supplement stratigraphic information obtained during MACTEC's soil sampling program and to acquire shear wave velocities and compressional wave velocities as a function of depth, as a component of the Vogtle Electric Generating Plant Advanced Light Water Reactor Early Site Permit Project.

BORING DESIGNATION	DATES LOGGED	ELEVATION	COORDINATES	
			NORTHING	EASTING
B-1002	9/22/05, 9/23/05	221.98	7998.524	6985.474
B-1002A	10/05/05	222.27	7985.618	6986.068
B-1003	10/03/05, 10/22/05, 11/10/05, 11/11/05	223.21	7974.364	7889.853
B-1004	10/04/05	249.78	7985.411	6131.444
C-1005A	10/06/05	223.66	7989.752	8179.263

Table 1. Boring locations and logging dates

The OYO Model 170 Suspension Logging Recorder and Suspension Logging Probe were used to obtain in-situ horizontal shear and compressional wave velocity measurements at 1.6 or 3.3 ft intervals. The acquired data was analyzed and a profile of velocity versus depth was produced for both compressional and horizontally polarized shear waves.

A detailed reference for the velocity measurement techniques used in this study is:

> Guidelines for Determining Design Basis Ground Motions, Report TR-102293, Electric Power Research Institute, Palo Alto, California, November 1993, Sections 7 and 8.

INSTRUMENTATION

Suspension Instrumentation

Suspension soil velocity measurements were performed using the Model 170 suspension logging system, S/N 19029, manufactured by OYO Corporation. This system directly determines the average velocity of a 3.3 ft high segment of the soil column surrounding the boring of interest by measuring the elapsed time between arrivals of a wave propagating upward through the soil column. The receivers that detect the wave, and the source that generates the wave, are moved as a unit in the boring producing relatively constant amplitude signals at all depths.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave source (S_H) and compressional-wave source (P), joined to two biaxial receivers by a flexible isolation cylinder, as shown in Figure 1. The separation of the two receivers is 3.3 ft, allowing average wave velocity in the region between the receivers to be determined by inversion of the wave travel time between the two receivers. Initial runs were performed in B-1002 using a shorter 19 ft probe configuration on September 22, 2005, but due to observed high amplitude signals, and the possibility of saturation of the receivers by those high amplitude signals, the longer 22 ft configuration was used for all subsequent measurements. Throughout the text, dimensions for the longer 22 ft configuration, as shown in Figure 1, will be given, followed by dimensions for the shorter configuration, as shown in Figure 2, enclosed in parenthesis. The total length of the probe as used in these surveys is 22 (19) ft, with the center point of the receiver pair 15.4 (12.1) ft above the bottom end of the probe.

The probe receives control signals from, and sends the amplified receiver signals to, instrumentation on the surface via an armored 4 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data, using a 3.28 ft diameter sheave fitted with a digital rotary encoder.

The entire probe is suspended by the cable and centered in the boring by nylon "whiskers", therefore, source motion is not coupled directly to the boring walls; rather, the source motion creates a horizontally propagating impulsive pressure wave in the fluid filling the boring and surrounding the source. This pressure wave is converted to P and S_H-waves in the surrounding soil and rock as it passes through the casing and grout annulus and impinges upon the wall of the boring. These waves propagate through the soil and rock surrounding the boring, in turn causing a pressure wave to be generated in the fluid surrounding the receivers as the soil waves pass their location. Separation of the P and S_H-waves at the receivers is performed using the following steps:

1. Orientation of the horizontal receivers is maintained parallel to the axis of the source, maximizing the amplitude of the recorded S_H -wave signals.
2. At each depth, S_H-wave signals are recorded with the source actuated in opposite directions, producing S_H-wave signals of opposite polarity, providing a characteristic S_H-wave signature distinct from the P-wave signal.
3. The 10.4 (7.02) ft separation of source and receiver 1 permits the P-wave signal to pass and damp significantly before the slower S_H-wave signal arrives at the receiver. In faster soils or rock, the isolation cylinder is extended to allow greater separation of the P- and S_H-wave signals.
4. In saturated soils, the received P-wave signal is typically of much higher frequency than the received S_H-wave signal, permitting additional separation of the two signals by low pass filtering.
5. Direct arrival of the original pressure pulse in the fluid is not detected at the receivers because the wavelength of the pressure pulse in fluid is significantly greater than the dimension of the fluid annulus surrounding the probe (meter versus centimeter scale), preventing significant energy transmission through the fluid medium.

In operation, a distinct, repeatable pattern of impulses is generated at each depth as follows:

1. The source is fired in one direction producing dominantly horizontal shear with some vertical compression, and the signals from the horizontal receivers situated parallel to the axis of motion of the source are recorded.
2. The source is fired again in the opposite direction and the horizontal receiver signals are recorded.
3. The source is fired again and the vertical receiver signals are recorded. The repeated source pattern facilitates the picking of the P and S_H-wave arrivals; reversal of the source changes the polarity of the S_H-wave pattern but not the P-wave pattern.

The data from each receiver during each source activation is recorded as a different channel on the recording system. The Model 170 has six channels (two simultaneous recording channels), each with a 12 bit 1024 sample record. The recorded data is displayed on a CRT display and on paper tape output as six channels with a common time scale. Data is stored on 3.5 inch floppy diskettes for further processing. Up to 8 sampling sequences can be summed to improve the signal to noise ratio of the signals.

Review of the displayed data on the CRT or paper tape allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and summing number to optimize the quality of the data before recording. Verification of the calibration of the Model 170 digital recorder is performed every twelve months using a NIST traceable frequency source and counter, as outlined in Appendix B.

Caliper / Natural Gamma Instrumentation

Caliper and natural gamma data were collected using a Model 3ACS 3-leg caliper probe, S/N 2915, manufactured by Robertson Geologging, Ltd. With the short arm configuration used in these surveys, the probe permits measurement of boring diameters between 1.6 - 12 in., concurrent with measurement of natural gamma emission from the boring walls. The probe is 6.82 ft long, and 1.5 inches in diameter.

This probe is useful in the following studies:

- Measurement of boring diameter and volume
- Location of hard and soft formations
- Location of fissures, caving, pinching and casing damage
- Bed boundary identification
- Strata correlation between borings

The probe receives control signals from, and sends the digitized measurement values to, a Robertson Micrologger II, S/N 5310, on the surface via an armored 4 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data, using a 3.28 ft diameter sheave fitted with a digital rotary encoder. The probe and depth data are transmitted by USB link from the Micrologger unit to a laptop computer where it is displayed and stored on hard disk.

The caliper consists of three arms, each with a toothed quadrant at their base, pivoted in the lower probe body. A toothed rack engages with each quadrant, thus constraining the arms to move together. Linear movement of the rack is converted to opening and closing of the arms. Springs hold the arms open in the operating position. A motor drive is provided to retract the arms, allowing the probe to be lowered into the boring. The rack is coupled to a potentiometer which converts movement into a voltage sensed by the probe's microprocessor.

Natural gamma measurements rely upon small quantities of radioactive material contained in all rocks to emit gamma radiation as they decay. Trace amounts of Uranium and Thorium are present in a few minerals, where potassium-bearing minerals such as feldspar, mica and clays will include traces of a radioactive isotope of Potassium. These emit gamma radiation as they decay with an extremely long half-life. This radiation is detected by scintillation - the production of a tiny flash of light when gamma rays strike a crystal of sodium iodide. The light is converted into an electrical pulse by a photomultiplier tube. Pulses above a threshold value of 60 KeV are counted by the probe's microprocessor. The measurement is useful because the radioactive elements are concentrated in certain rock types e.g. clay or shales, and depleted in others e.g. sandstone or coal.

Resistivity / Spontaneous Potential Instrumentation

Resistivity, spontaneous potential and natural gamma data were collected using a Model ELXG electric log probe, S/N 3040, manufactured by Robertson Geologging, Ltd. This probe measures Single Point Resistance (SPR), short normal resistivity (16”), long normal resistivity (64”), Spontaneous Potential (SP) and natural gamma. The probe is 8.20 ft long, and 1.73 inches in diameter.

This probe is useful in the following studies:

- Bed boundary identification
- Strata correlation between borings
- Strata geometry and type (shale indication)

The probe receives control signals from, and sends the digitized measurement values to, a Robertson Micrologger II, S/N 5310, on the surface via an armored 4 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data, using a 3.28 ft diameter sheave fitted with a digital rotary encoder. The probe and depth data are transmitted by USB link from the Micrologger unit to a laptop computer where it is displayed and stored on hard disk.

The resistivity section of the probe operates by driving an alternating current into the formation from the central SPR/DRIVE electrode. The current returns via the logging cable armor. To ensure adequate penetration of the formation the logging cable is insulated for approximately 30 feet from the cablehead. Voltages are measured between the 16" and 64" electrodes and the remote earth connection at surface, as noted below:

- Single Point Resistance (SPR): The current flowing to the cable armor is measured along with the voltage at the SPR electrode. The voltage divided by current gives resistance.

- Spontaneous Potential (SP): This is the DC bias of the 16" electrode with respect to the voltage return at the surface (ground stake).

Data quality depends upon good grounding at the surface. This is achieved with a metal stake driven into the mud-pit.

Natural gamma data was collected during the caliper data run, so this function, though present in this probe, was not used during these logging runs.

Boring Deviation Instrumentation

Boring deviation data were collected using a Model HIRAT High Resolution Acoustic Televiewer probe, S/N 5174, manufactured by Robertson Geologging, Ltd. This probe is generally used to acquire acoustic images of the boring wall, but may also be used to collect boring deviation data. The probe is 7.58 ft long, and 1.9 inches in diameter, and is fitted with upper and lower four-arm centralizers.

This probe is useful in the following studies:

- Measurement of boring diameter and volume
- Location of hard and soft formations
- Location of fissures, caving, pinching and casing damage
- Bed boundary identification
- Strata correlation between borings

The probe receives control signals from, and sends the digitized measurement values to, a Robertson Micrologger II, S/N 5310, on the surface via an armored 4 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured to provide probe depth data, using a 3.28 ft diameter sheave fitted with a digital rotary encoder. The probe and depth data are transmitted by USB link from the Micrologger unit to a laptop computer where it is displayed and stored on hard disk.

MEASUREMENT PROCEDURES

Suspension Measurement Procedures

All five borings were logged as uncased borings, filled with bentonite or polymer based drilling mud. Measurements followed the GEOVision standard field procedures, as presented in Appendix C. Prior to use, the measuring sheave and rotary encoder function were checked using a steel tape by Jay Fagan of MACTEC. In each boring, the probe was positioned with the mid-point of the receiver spacing at grade, and the electronic depth counters were set to zero. The probe was lowered to the bottom of the boring, and then returned to the surface, stopping at 1.6 ft or 3.3 ft intervals to collect data, as summarized in Table 2, below.

At each measurement depth the measurement sequence of two opposite horizontal records and one vertical record was performed, and the gains were adjusted as required. The data from each depth was printed on paper tape, checked, and recorded on diskette before moving to the next depth.

Upon completion of the measurements, the probe zero depth indication at grade was verified prior to removal from the boring.

Caliper / Natural Gamma Measurement Procedures

Caliper and natural gamma data were collected in Borings B-1002, B-1003 and B-1004. No caliper or natural gamma data was collected in C-1005A. No caliper data was collected in B-1002A either, however, natural gamma data for the shallow (dry) sections of B-1002 and B-1004 were collected through the PVC casing, as summarized in Table 2, below. With the preceding two exceptions, the borings were logged as uncased borings, filled with bentonite or polymer based drilling mud.

Prior to use, the caliper tool was calibrated, using the supplied three point calibration jig, which is a circular plate with a series of holes in the top surface into which the tips of the caliper arms fit. This has circles of diameters from 2" to 12", as verified using a NIST traceable caliper by

Jay Fagan of MACTEC. Alternatively, it is possible to use pipe sections of known internal diameter. The calibration jig is placed over a bucket with the probe standing upright with its nose section passing through the jig's central hole. The caliper probe arms are opened under program control, and the tips of the arms are placed in the holes marked with the required diameter. the value of the current calibration point, as stamped on the jig, is entered via the control computer. The system counts for 15 seconds to make an average of the response. The procedure is repeated for the second and third required openings.

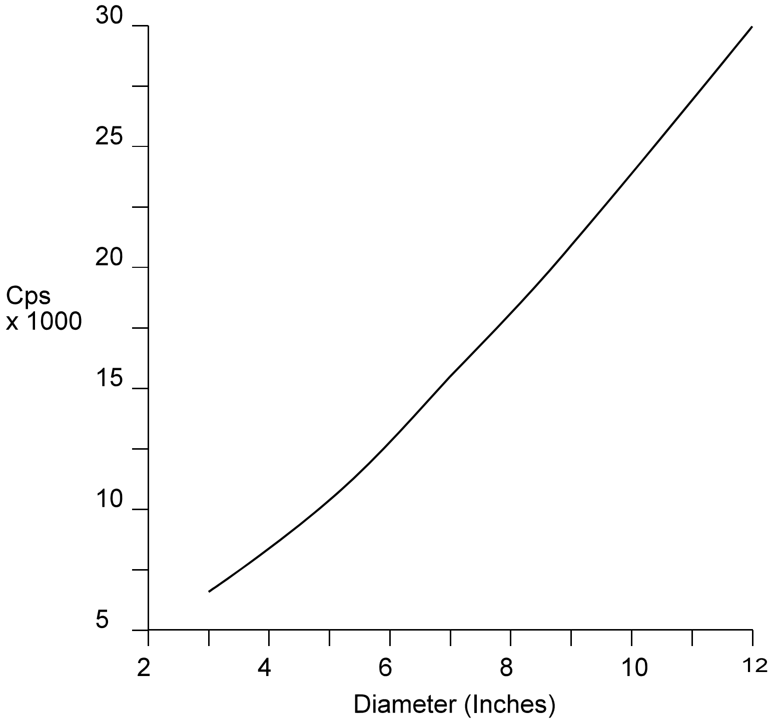

Figure 1. Example Calibration Curve for Caliper Probe

The computation and generation of the calibration coefficient file is entirely automatic. The calibration file is simply the set of coefficients of a quadratic curve which fits the three data points. Figure 1 shows the response of a caliper probe using data gathered during calibration. In addition, the caliper calibration is effectively checked at the end of each run by measuring the inside diameter of the casing at the top of the boring. Natural gamma was not calibrated in the field, as it is a qualitative measurement, not a quantitative value, and is used only to assist in picking transitions between stratigraphic units.

In each boring, the probe was positioned with the top of the probe at grade, and the electronic depth counter was set to 6.82 ft, the specified length of the probe, as verified with a tape measure. The probe was lowered to the bottom of the boring, where the caliper legs were opened, and data collection begun. The probe was then returned to the surface at 9.8 ft/sec, collecting data continuously at 0.033 ft spacing, as summarized in Table 2, below.

Upon completion of the measurements, the probe zero depth indication at grade was verified prior to removal from the boring, as summarized in Table 3, below.

Resistivity / Spontaneous Potential Measurement Procedures

Resistivity and spontaneous potential data were collected in Borings B-1002, B-1003 and B-1004. No resistivity or spontaneous potential data was collected in B-1002A or C-1005A.

After attaching the probe to the logging cable, the probe head was insulated by wrapping all exposed metal of the cablehead and probe with self-amalgamating insulation tape. The 30 ft insulating sleeve on the logging cable was checked for any damage, and repaired with self-amalgamating insulation tape as needed.

The reference ground stake was driven firmly into the mud pit, and connected to the ground socket on the winch switch box.

This sonde measures real units downhole, so there is no calibration procedure to be followed for these channels.

In each boring, the probe was positioned with the top of the probe at grade, and the electronic depth counter was set to 8.2 ft, the specified length of the probe, as verified with a tape measure. The probe was lowered to the bottom of the boring, where data collection was begun. The probe was then returned to the surface at 16.4 ft/sec, collecting data continuously at 0.033 ft spacing, as summarized in Table 2, below. The natural gamma data collected in this log is redundant with the data collected in the caliper / natural gamma log, so the slower 9.8 ft/sec speed used to optimize natural gamma data resolution was not employed for this log.

When the uninsulated section of the logging cable left the boring fluid, or entered steel casing, the log was terminated, as the sonde does not function under these conditions.

Upon completion of the measurements, the probe zero depth indication at grade was verified prior to removal from the boring, as summarized in Table 3, below.

Boring Deviation Measurement Procedures

Boring deviation data was collected only in B-1003, to a depth of 1072.8 ft. The deeper section of B-1003 was not logged with this tool due to the significant voids and fractures observed on the caliper log of that section. It was decided that the risk of probe loss was too great to justify attempting such a log. Data was collected in a bentonite based drilling mud.

Prior to use, the deviation probe tiltmeters and compass function were checked by hanging from the drill rig and by comparison with a Brunton surveyors' compass.

The probe was positioned with the tip of the probe at grade, and the electronic depth counter was set to 0.0 ft. The probe was lowered to the bottom of the boring, and data collection begun. The probe was then returned to the surface at 9.8 ft/sec, collecting data continuously at 0.033 ft spacing, as summarized in Table 2, below.

Upon completion of the measurements, the probe zero depth indication at grade was verified prior to removal from the boring, as summarized in Table 3, below.

BORING NUMBER	TOOL AND RUN NUMBER	DEPTH RANGE (FEET)	OPEN HOLE (FEET)	DEPTH TO BOTTOM OF CASING (FEET)	SAMPLE INTERVAL (FEET)	DATE LOGGED
B-1002	SUSPENSION 1	88.6 – 242.8	258	88.5	1.6	9/22/05
B-1002	CALIPER 1	0 – 254.8	258	88.5	0.033	9/22/05
B-1002	ELOG 1	86.3 – 256.5	258	88.5	0.033	9/23/05
B-1002	SUSPENSION 2	1.64 - 54.1	70	NO CASING	1.6	9/23/05
B-1002	ELOG 2	3.3 – 69.9	70	NO CASING	0.033	9/23/05
B-1002A	SUSPENSION 1	49.2 – 68.9	85	NO CASING	1.6	10/5/05
B-1003	SUSPENSION 1	64.0 – 157.5	1074	88.0	1.6	10/3/05
B-1003	SUSPENSION 1	157.5 – 1033.5	1074	88.0	3.3	10/3/05
B-1003	SUSPENSION 1	1033.5 – 1061.4	1074	88.0	1.6	10/3/05
B-1003	CALIPER 1	0 – 1076.3	1074	88.0	0.033	10/3/05
B-1003	ELOG 1	DATA LOST	1074	88.0	0.033	10/3/05
B-1003	DEVIATION 1	0 – 1072.8	1074	88.0	0.033	10/3/05
B-1003	ELOG 2	82.9 – 1062.1	1065	88.0	0.033	10/22/05
B-1003	SUSPENSION 2	1053.2 – 1309.1	1324	1054	1.6	11/10/05
B-1003	CALIPER 2	1051.7 – 1324.2	1324	1054	0.033	11/10/05
B-1003	ELOG 3	1050.1 – 1324.0	1324	1054	0.033	11/10/05
B-1003	SUSPENSION 3	1302.5 – 1327.1	1338	1054	1.6	11/11/05
B-1004	SUSPENSION 1	134.5 – 285.8	302	135	1.6	10/4/05
B-1004	CALIPER 1	0 – 303.4	302	135	0.033	10/4/05
B-1004	ELOG 1	118.2 – 303.4	302	135	0.033	10/4/05
C-1005A	SUSPENSION 1	3.3 – 32.8	48	NO CASING	1.6	10/6/05

Table 2. Logging dates and depth ranges

BORING NUMBER	TOOL AND RUN NUMBER	TOOL HIT BOTTOM (FT)	DRILLER DEPTH (FT)	START DEPTH (FT)	END DEPTH (FT)	DEPTH BUST (FT)
B-1002	SUSPENSION 1	254.9	260	0.0	0.07	0.07
B-1002	CALIPER 1	254.8	260	6.82	6.89	0.07
B-1002	ELOG 1	256.5	260	8.20	8.20	0.0
B-1002	SUSPENSION 2	69.5	70	0.0	0.0	0.0
B-1002	ELOG 2	69.9	70	8.20	8.20	0.0
B-1002A	SUSPENSION 1	84.3	105	0.0	0.0	0.0
B-1003	SUSPENSION 1	1076.8	1074	6.56	5.94	-0.38
B-1003	CALIPER 1	1079.1	1074	6.82	6.61	-0.22
B-1003	ELOG 1	1078.4	1074	8.20	8.07	-0.13
B-1003	DEVIATION 1	1072.8	1074	0.0	0.3	0.3
B-1003	ELOG 2	1062.1	1060	8.20	8.02	-0.18
B-1003	SUSPENSION 2	1324.5	1324	172.08	171.82	-0.26
B-1003	CALIPER 2	1324.2	1324	172.34	172.01	-0.33
B-1003	ELOG 3	1324.2	1324	173.72	173.23	-0.49
B-1003	SUSPENSION 3	1342.5	1338	168.5	168.0	-0.5
B-1004	SUSPENSION 1	301.2	302	0.0	0.0	0.0
B-1004	CALIPER 1	304.1	302	6.82	6.80	-0.02
B-1004	ELOG 1	304.1	302	8.20	8.20	0.0
C-1005A	SUSPENSION 1	48.2	90	0.0	0.0	0.0

Table 3. Boring Bottom Depths and Start / Stop Depth Errors

DATA ANALYSIS

Suspension Analysis

Using the proprietary OYO program PSLOG.EXE version 1.0, included in volume 2 of 2 (CDR) of this report, the recorded digital waveforms were analyzed to locate the most prominent first minima, first maxima, or first break on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between receiver 1 and receiver 2 (R1-R2) arrivals was used to calculate the P-wave velocity for that 3.3 ft segment of the soil column. When observable, P-wave arrivals on the horizontal axis records were used to verify the velocities determined from the vertical axis data. The time picks were then transferred into an EXCEL template (EXCEL version 2003 SP2) to complete the velocity calculations based upon the arrival time picks made in PSLOG. The PSLOG pick files and the EXCEL analysis files are included in the boring specific directories on volume 2 of 2 (CDR) of this report.

The P-wave velocity over the 10.4 (7.02) ft interval from source to receiver 1 (S-R1) was also picked using PSLOG, and calculated and plotted in EXCEL, for quality assurance of the velocity derived from the travel time between receivers. In this analysis, the depth values as recorded were increased by 6.79 (5.15) ft to correspond to the mid-point of the 10.4 (7.02) ft S-R1 interval, as illustrated in Figure 1. Travel times were obtained by picking the first break of the P-wave signal at receiver 1 and subtracting 3.0 milliseconds, the calculated and experimentally verified delay from source trigger pulse (beginning of record) to source impact. This delay corresponds to the duration of acceleration of the solenoid before impact.

As with the P-wave records, using PSLOG, the recorded digital waveforms were analyzed to locate the presence of clear S_H-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the S_H-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT - IFFT lowpass filtering was used to remove the higher frequency P-wave signal from the S_H-wave signal. Different filter cutoffs were used to separate P- and S_H-waves at different depths, ranging from 600 Hz in the slowest zones to 4000 Hz in the regions of highest velocity. At each depth, the filter frequency was selected to be at least twice the fundamental frequency of the S_H-wave signal being filtered.

Generally, the first maxima were picked for the 'normal' signals and the first minima for the 'reverse' signals, although other points on the waveform were used if the first pulse was distorted. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in the actuation time of the solenoid source caused by constant mechanical bias in the source or by boring inclination. This variation does not affect the R1-R2 velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity value is the average of the values obtained from the 'normal' and 'reverse' source actuations.

As with the P-wave data, S_H-wave velocity calculated from the travel time over the 10.4 ft interval from source to receiver 1 was calculated and plotted for verification of the velocity derived from the travel time between receivers. In this analysis, the depth values were increased by 6.79 (5.15) ft to correspond to the mid-point of the 10.4 (7.02) ft S-R1 interval. Travel times were obtained by picking the first break of the S_H-wave signal at the near receiver and subtracting 3.0 milliseconds, the calculated and experimentally verified delay from the beginning of the record at the source trigger pulse to source impact.

These data and analysis were reviewed by John Diehl as a component of GEOVision's in-house QA-QC program, and by Dr. Richard Lee, as an independent expert review.

Figure 2 shows an example of R1 - R2 measurements on a sample filtered suspension record. In Figure 2, the time difference over the 3.3 ft interval of 1.88 milliseconds for the horizontal signals is equivalent to an S_H-wave velocity of 1745 ft/sec. Whenever possible, time differences were determined from several phase points on the S_H-waveform records to verify the data obtained from the first arrival of the S_H-wave pulse. Figure 3 displays the same record before filtering of the S_H-waveform record with a 1400 Hz FFT - IFFT digital lowpass filter, illustrating the presence of higher frequency P-wave energy at the beginning of the record, and distortion of the lower frequency S_H-wave by residual P-wave signal.

Caliper / Natural Gamma Analysis

No analysis is required with the caliper or natural gamma data. The data are converted to LAS format and transmitted to the client.

Resistivity / Spontaneous Potential Analysis

No analysis is required with the resistivity or spontaneous potential data. The data are converted to LAS format and transmitted to the client.

Boring Deviation Analysis

The collected Acoustic Televiewer data was processed with Robertson Geologging's RGLDIP program, version 6.1, to extract the deviation data and produce an ASCII file and plots of deviation data.

RESULTS

Suspension Results

Suspension R1-R2 P- and S_H-wave velocities are plotted in Figures 5 - 8. The suspension velocity data presented in these figures are presented in Tables 3 - 6. The PSLOG and EXCEL analysis files for each boring are included in the boring specific directories on volume 2 of 2 (CDR) of this report, along with the raw and filtered waveforms.

P- and S_H-wave velocity data from R1-R2 analysis and quality assurance analysis of S-R1 data are plotted together in Figures A1 –A4 to aid in visual comparison. It must be noted that R1-R2 data is an average velocity over a 3.3 ft segment of the soil column; S-R1 data is an average over 10.4 (7.02) ft, creating a significant smoothing relative to the R1-R2 plots. S-R1 data are presented in Tables A1 – A4, and included in the EXCEL analysis files for each boring on volume 2 of 2 (CDR) of this report.

Calibration procedures and records for the suspension measurement system are presented in Appendix B.

The GEOVision standard field procedures are reproduced in Appendix C.

The GEOVision standard field log sheets for all borings are reproduced in Appendix D.

Caliper/ Natural Gamma Results

Caliper and natural gamma data is presented in combined log plots with resistivity and spontaneous potential in Appendix E. LAS 2.0 data and Acrobat files for each boring are included in the boring specific sub-directories in the data directory on volume 2 of 2 (CDR) of this report.

Resistivity / Spontaneous Potential Results

Resistivity and spontaneous potential data is presented in combined log plots with caliper and natural gamma data in Appendix E. LAS 2.0 data and Acrobat files for each boring are included in the boring specific sub-directories in the data directory on volume 2 of 2 (CDR) of this report.

Boring Deviation Results

Boring deviation data is presented graphically in Figure 8. Deviation data is provided in EXCEL and Acrobat formats in the B-1003 sub-directory in the data directory on volume 2 of 2 (CDR) of this report.

SUMMARY

Discussion of Suspension Results

Suspension PS velocity data is ideally collected in an uncased fluid filled boring, drilled with rotary mud (rotary wash) methods. Due to the difficult drilling conditions at this site, some portions of the borings would not stay open above water table, and some significant wash-outs of the borings occurred below water table, as shown in the caliper logs. Despite these washouts, the quality of these data ranged from good to excellent. Each boring is discussed in more detail below.

Suspension PS velocity data quality is judged based upon 5 criteria:

1. Consistent data between receiver to receiver (R1 – R2) and source to receiver (S – R1) data.
2. Consistent relationship between P-wave and S_H -wave (excluding transition to saturated soils)
3. Consistency between data from adjacent depth intervals.
4. Clarity of P-wave and S_H-wave onset, as well as damping of later oscillations.
5. Consistency of profile between adjacent borings, if available.

B-1002, B-1002A: These data show excellent correlation between R1 – R2 and S – R1 data, as well as excellent correlation between P-wave and S_H-wave velocities, with the exception of a region between 30 and 40 ft, which appears to be a perched water table. P-wave and S_H-wave onsets are generally clear, and later oscillations are well damped. This is an excellent data set.

B-1003: These data show excellent correlation between R1 – R2 and S – R1 data, as well as excellent correlation between P-wave and S_H-wave velocities. P-wave and S_H-wave onsets are clear, and later oscillations are well damped. The data from this boring is in very close agreement with the velocities obtained in B-1002. This is an exceptional data set.

B-1004: These data show excellent correlation between R1 – R2 and S – R1 data, as well as excellent correlation between P-wave and S_H-wave velocities. P-wave and S_H-wave onsets are clear, and later oscillations are well damped. This is an excellent data set.

C-1005A: These data show good correlation between R1 – R2 and S – R1 data, as well as good correlation between P-wave and S_H-wave velocities. P-wave and S_H-wave onsets are generally clear, though later oscillations are not well damped. The data from this boring is in fair agreement with the velocities obtained in B-1002. This is a fair to good data set.

Discussion of Caliper / Natural Gamma Results

B-1002: This is a excellent data set for the entire depth of the boring, though caliper data is only useful below the bottom of the PVC casing at 88.5 ft.

B-1003: This is a excellent data set for the entire depth of the boring, though caliper data is only useful below the bottom of the PVC casing at 88 ft.

B-1004: This is a excellent data set for the entire depth of the boring, though caliper data is only useful below the bottom of the PVC casing at 135 ft,

C-1005A: No caliper / natural gamma data was collected in this boring.

Discussion of Resistivity / Spontaneous Potential Results

B-1002: These data show good correlation between the different logs below 92 ft. The data is degraded above 128 ft, as the insulated cable moved into the PVC casing at this point on run 1, and the shallower run 2 data was degraded by fluid loss in the uncased boring.

B-1003: These data show good correlation between the different logs below 128 ft. The data is degraded above 128 ft, as the insulated cable moved into the casing at this point on run 2. Also, on run 3, the insulated cable moved into the casing at 1084 ft, degrading the data from this run above this depth.

B-1004: Spontaneous potential measurements did not appear to be successful in this boring, and resistivity data was poor. Despite several different placements of the ground rod, the data continued to be anomalous on four attempts to collect data. The most plausible explanation is due to currents induced in the ground by ground cables from nearby power lines. The resistivity data may still be useful in validating unit boundaries.

C-1005A: No resistivity / spontaneous potential / natural gamma data was collected in this boring.

Discussion of Boring Deviation Results

B-1003: These data show a fairly constant slope of the boring of roughly 1 degree to the east for the entire depth of the boring, placing the 1050 ft depth mark 13 ft east of the boring collar.

Quality Assurance

These boring geophysical measurements were performed using industry-standard or better methods for measurements and analyses. All work was performed under GEOVision quality assurance procedures, which include:

- Use of NIST-traceable calibrations, where applicable, for field and laboratory instrumentation
- Use of standard field data logs

- Use of independent verification of velocity data by comparison of receiver-to-receiver and source-to-receiver velocities
- Independent review of calculations and results by a registered professional engineer, geologist, or geophysicist.

Suspension Data Reliability

P- and S_H-wave velocity measurement using the Suspension Method gives average velocities over a 3.3 ft interval of depth. This high resolution results in the scatter of values shown in the graphs. Individual measurements are very reliable with estimated precision of +/- 5%. Standardized field procedures and quality assurance checks contribute to the reliability of these data.

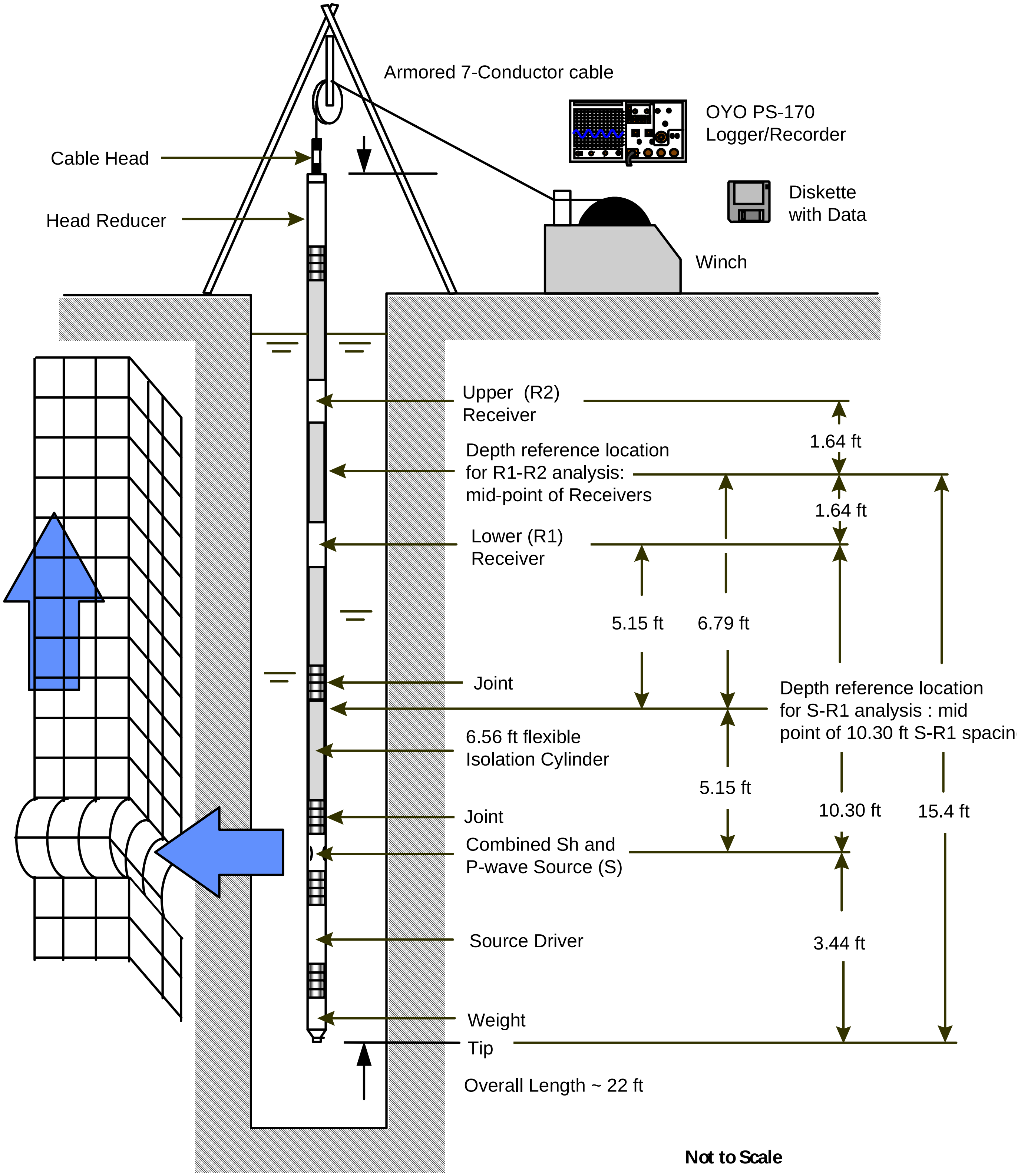

Figure 2. Concept illustration of long P-S logging system

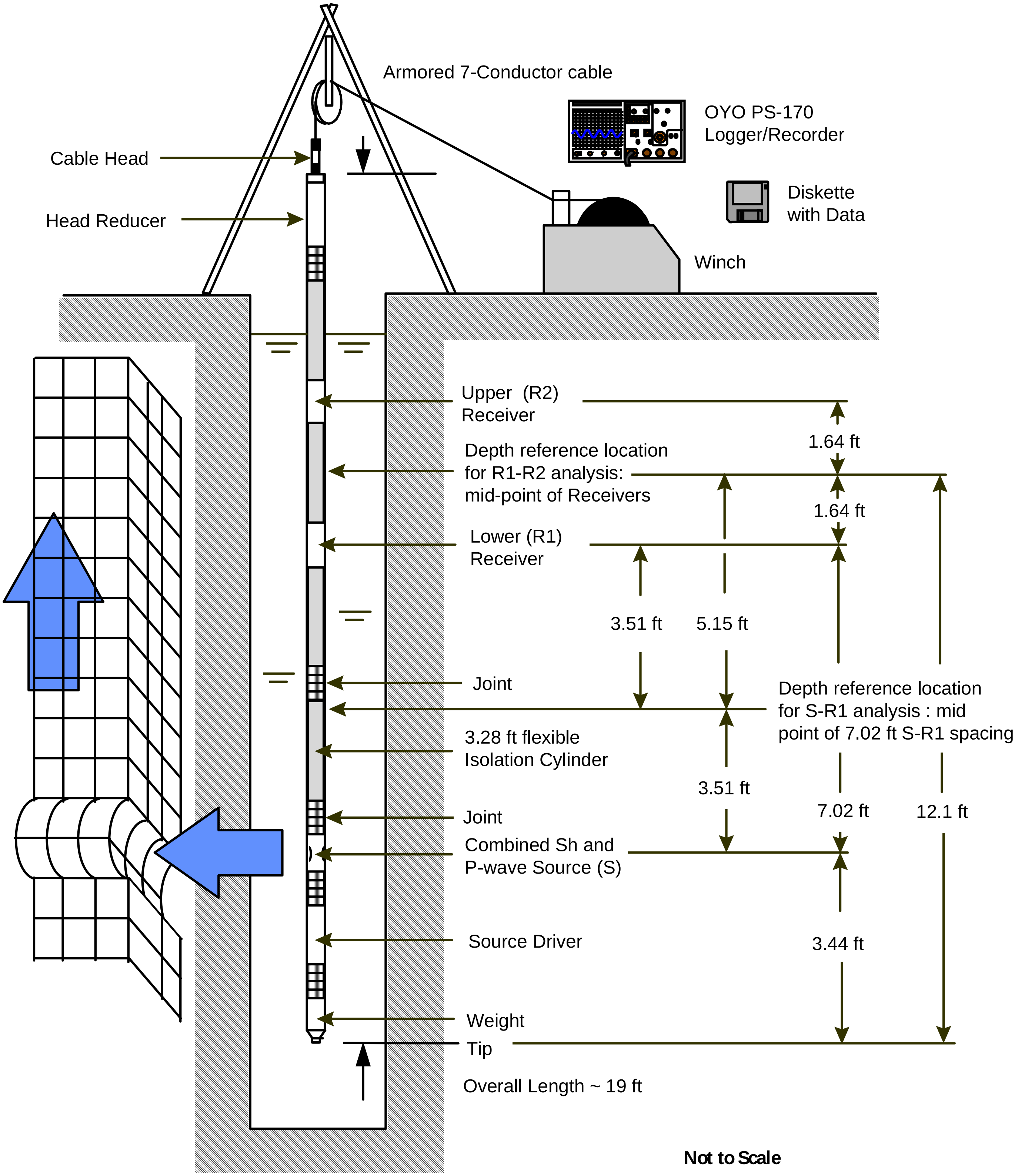

Figure 3. Concept illustration of short P-S logging system

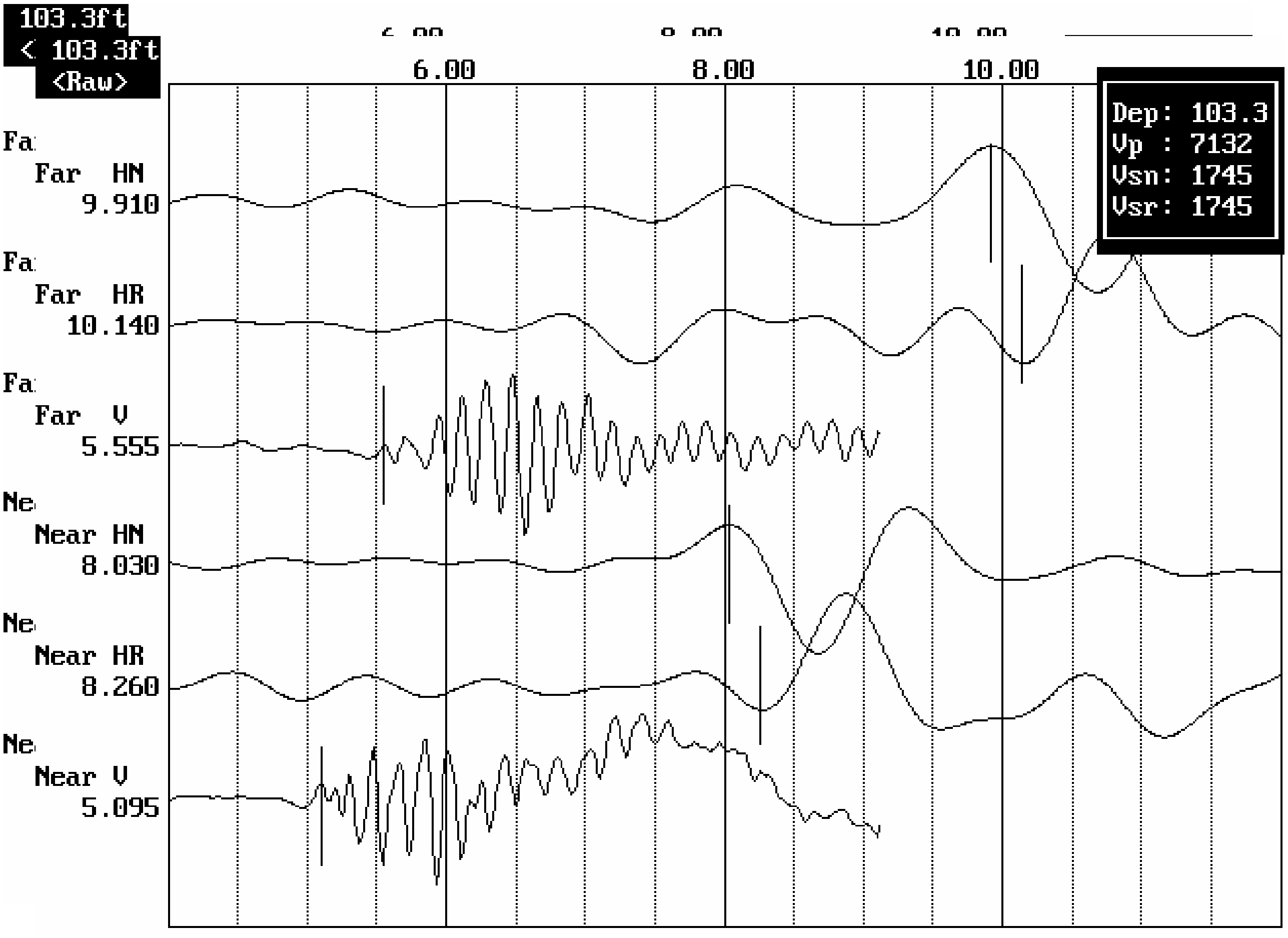

Figure 4. Example of filtered (1400 Hz lowpass) record

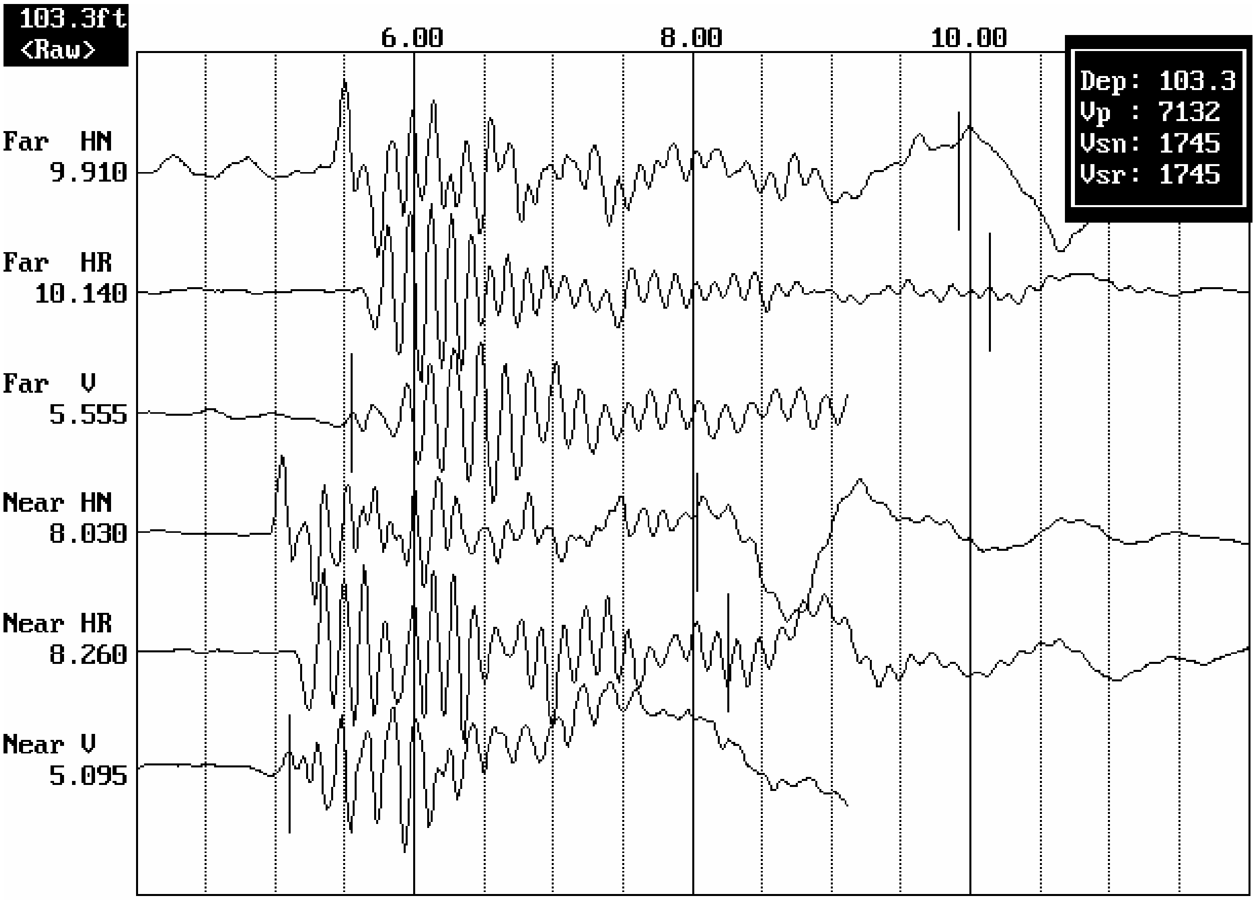

Figure 5. Example of unfiltered record

Plant Vogtle Boreholes B-1002 & B-1002A
Receiver to Receiver V_s and V_p Analysis

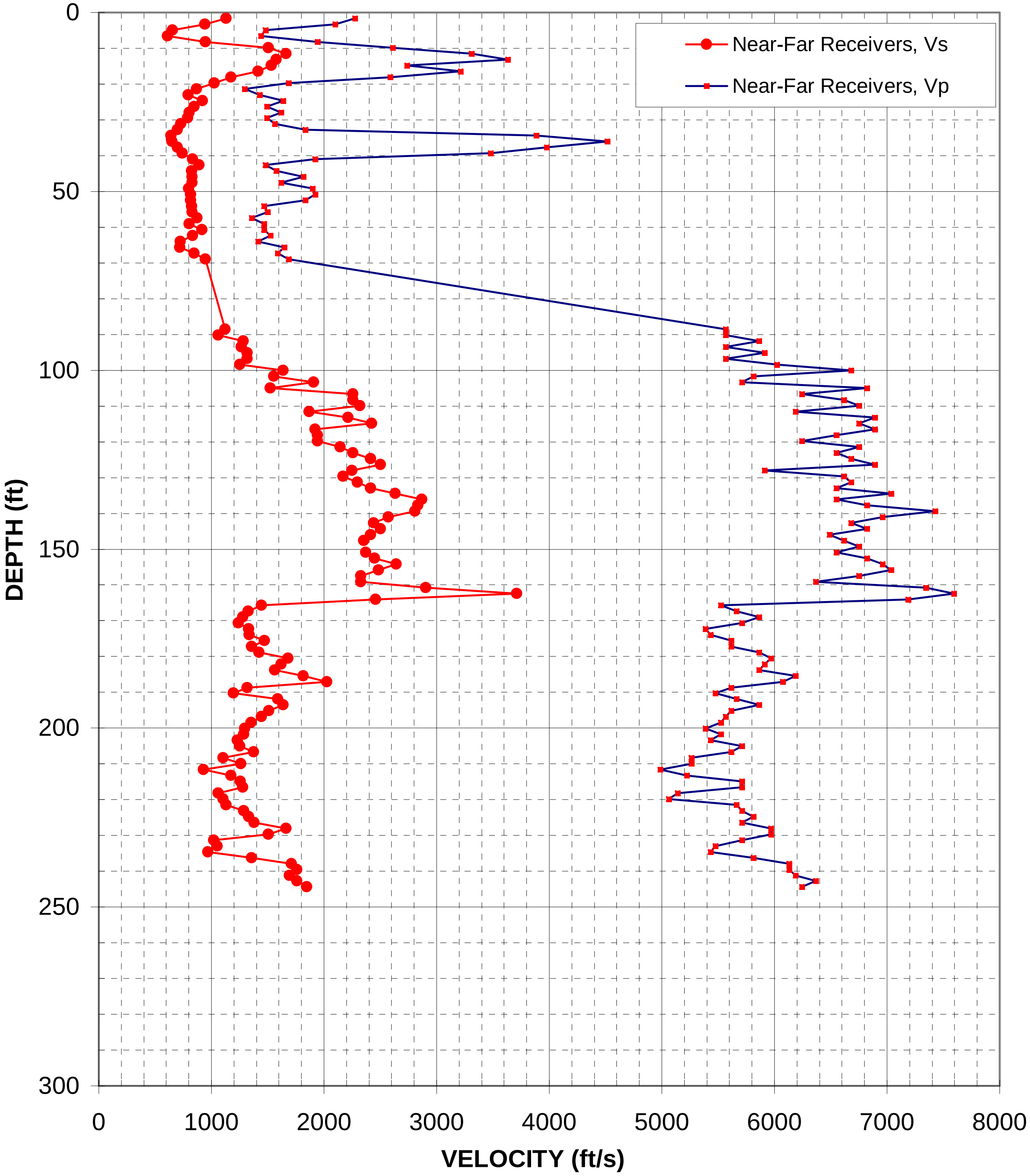

Figure 6. Boring B-1002 and B-1002A, Suspension R1-R2 P- and S_H-wave velocities

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
1.6	1130	2270
3.3	940	2100
4.9	650	1480
6.6	610	1440
8.2	950	1940
9.8	1510	2610
11.5	1660	3310
13.1	1580	3630
14.8	1530	2740
16.4	1420	3210
18.0	1180	2590
19.7	1030	1690
21.3	870	1300
23.0	800	1430
24.6	920	1640
26.3	850	1490
27.9	810	1620
29.5	790	1490
31.2	730	1560
32.8	700	1840
34.5	640	3890
36.1	650	4520
37.7	700	3980
39.4	740	3480
41.0	840	1920
42.7	890	1480
44.3	830	1580
45.9	830	1820
47.6	830	1620
49.2	800	1900
50.9	820	1920
52.5	820	1840
54.1	830	1470
55.8	830	1500
57.4	870	1360
59.1	810	1470
60.7	920	1470
62.3	840	1530
64.0	730	1420
65.6	720	1650
67.3	850	1590
68.9	950	1690
88.6	1120	5570
90.2	1060	5570
91.9	1290	5860
93.5	1270	5570
95.1	1320	5910
96.8	1320	5570
98.4	1250	6020
100.1	1640	6680
101.7	1550	5810
103.4	1910	5710
105.0	1530	6820
106.6	2260	6250
108.3	2260	6620
109.9	2320	6750
111.6	1870	6190
113.2	2210	6890
114.8	2420	6750
116.5	1920	6890
118.1	1940	6550
119.8	1940	6250
121.4	2140	6750
123.0	2260	6550
124.7	2410	6680
126.3	2500	6890
128.0	2250	5910
129.6	2170	6620
131.2	2300	6680
132.9	2410	6550
134.5	2630	7040
136.2	2870	6550
137.8	2830	6820
139.4	2810	7430
141.1	2570	6960
142.7	2440	6680
144.4	2500	6820
146.0	2410	6490
147.6	2350	6620
149.3	-	6750
150.9	2370	6550
152.6	2450	6820
154.2	2640	6960
155.8	2480	7040
157.5	2330	6750
159.1	2330	6370
160.8	2910	7340
162.4	3710	7590
164.0	2460	7190
165.7	1450	5520
167.3	1330	5660
169.0	1280	5860
170.6	1240	5710
172.2	1330	5390
173.9	1340	5430
175.5	1470	5620
177.2	1360	5620
178.8	1420	5860
180.5	1680	5970
182.1	1620	5910
183.7	1560	5860
185.4	1820	6190
187.0	2030	6080
188.7	1320	5620
190.3	1200	5480
191.9	1590	5660
193.6	1640	5860
195.2	1510	5620
196.9	1450	5570
198.5	1350	5520
200.1	1300	5390
201.8	1290	5520
203.4	1230	5430
205.1	1250	5710
206.7	1380	5620
208.3	1100	5260
210.0	1260	5260
211.6	930	4990
213.3	1170	5220
214.9	1260	5710
216.5	1280	5710
218.2	1060	5140
219.8	1110	5060
221.5	1130	5660
223.1	1290	5710
224.7	1330	5810
226.4	1380	5710
228.0	1660	5970
229.7	1510	5970
231.3	1020	5710
232.9	1050	5480
234.6	970	5430
236.2	1360	5810
237.9	1710	6130
239.5	1760	6130
241.1	1700	6190
242.8	1760	6370
244.4	1850	6250

Table 4. Boring B-1002 and B-1002A, Suspension R1-R2 depths and P- and S_H-wave velocities

Plant Vogtle Borehole B-1003
Receiver to Receiver V_s and V_p Analysis

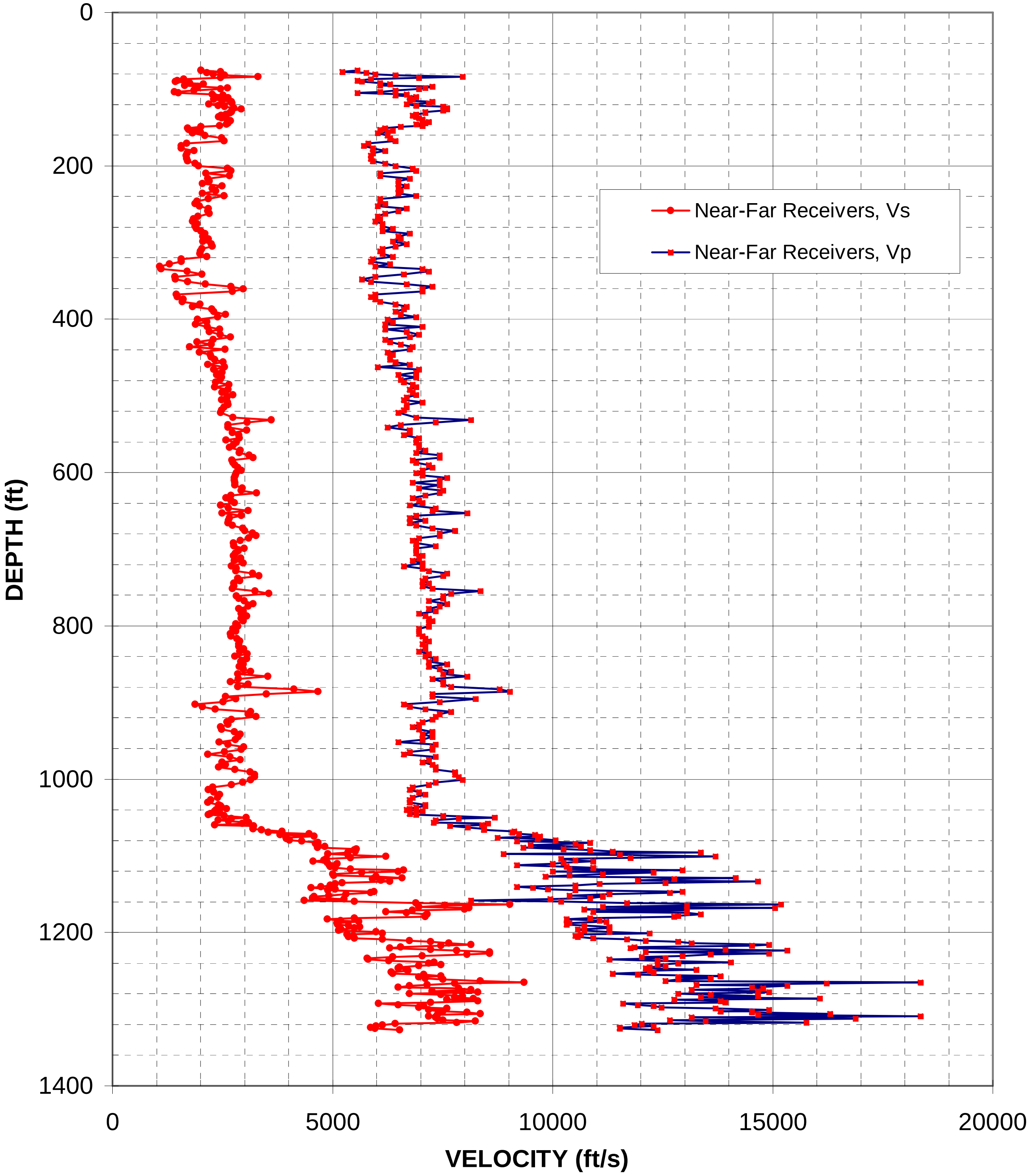

Figure 7. Boring B-1003, Suspension R1-R2 P- and S_H-wave velocities

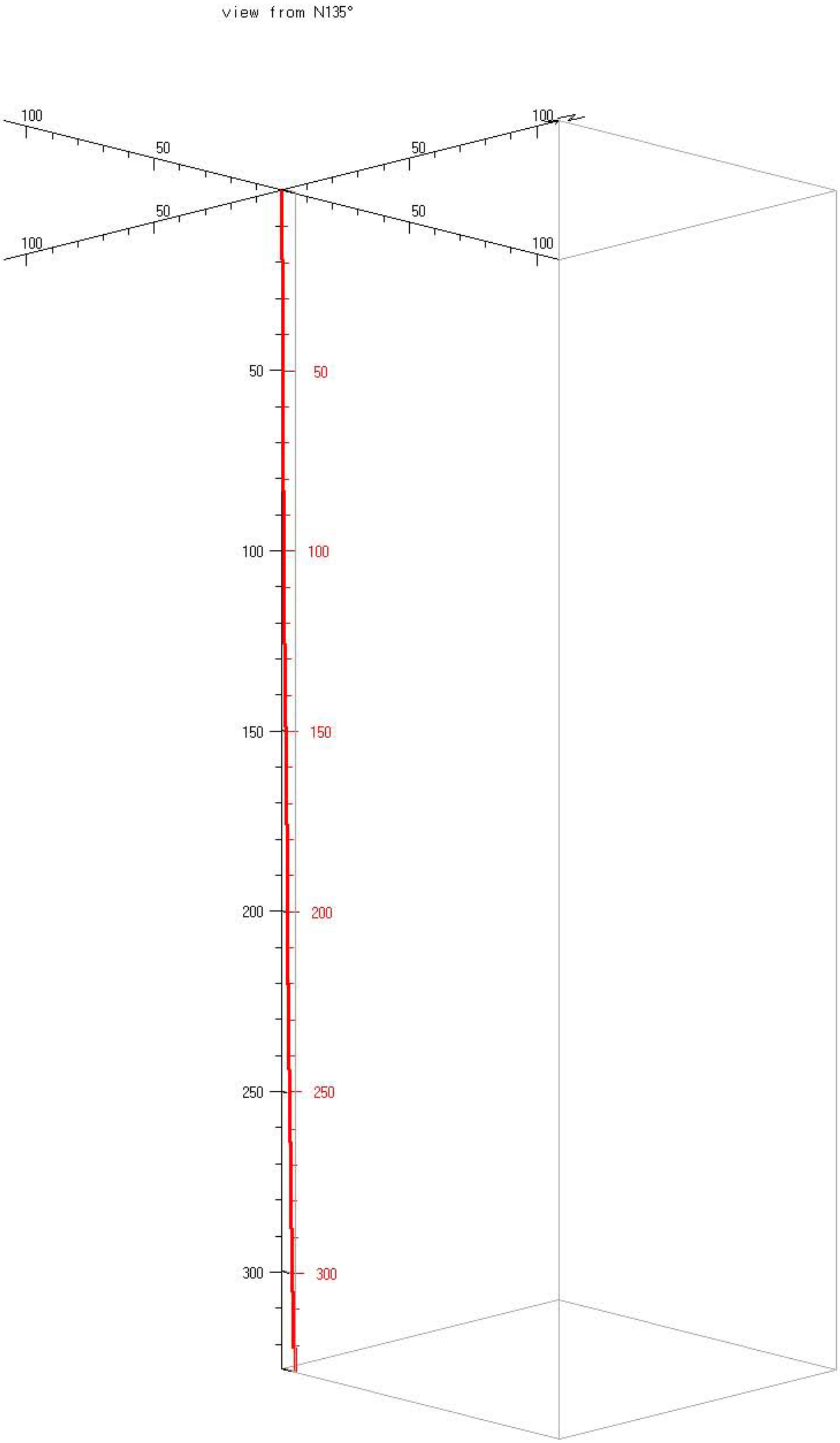

Figure 8. Boring B-1003, Deviation Projection (dimensions in meters)

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
75.5	2010	5570
77.1	2460	5220
78.7	2140	5760
80.4	2290	5970
82.0	2550	6430
83.7	3310	7960
85.3	2460	6960
86.9	1620	5860
88.6	1470	5570
90.2	1430	5660
91.9	1760	6080
93.5	2060	6310
95.1	1650	6080
96.8	1940	7260
98.4	2610	7110
100.1	2460	6960
101.7	1860	6430
103.4	1400	6080
105.0	1490	5570
106.6	2270	6680
108.3	2510	6430
109.9	2330	6890
111.6	2630	6750
113.2	2300	6820
114.8	2490	6750
116.5	2710	7260
118.1	2720	7190
119.8	2190	6680
121.4	2400	6890
123.0	2550	7510
124.7	2760	7590
126.3	2930	7590
128.0	2720	7510
129.6	2710	7110
131.2	2670	7110
132.9	2580	6890
134.5	2470	6820
136.2	2410	6890
137.8	2480	6960
139.4	2600	7040
141.1	2680	7040
142.7	2620	7190
144.4	2630	7110
146.0	2590	6890
147.6	2440	7040
149.3	2010	6550
150.9	1710	6190
152.6	1730	6080
154.2	1890	6370
155.8	2000	6250
157.5	1820	6020
160.8	2100	6250
164.0	2480	6310
167.3	2540	6430
170.6	1680	5810
173.9	1560	5710
177.2	1570	5910
180.5	1860	6190
183.7	1700	5910
187.0	1670	5860
190.3	1690	5860
193.6	1700	5910
196.9	1880	6190
200.1	1950	6430
203.4	2610	6820
206.7	2690	6890
210.0	2130	6080
213.3	2660	6080
216.5	2170	6750
219.8	2200	6490
223.1	2040	6490
226.4	2490	6680
229.7	2270	6490
232.9	2350	6550
236.2	2040	6490
239.5	2530	6890
242.8	2180	6080
246.1	1930	6080
249.3	1880	6190
252.6	1980	6020
255.9	2180	6680
259.2	2160	6490
262.5	2200	6190
265.8	1950	6020
269.0	1850	6080
272.3	1820	5970
275.6	1920	6130
278.9	1880	6130
282.2	1910	6370
285.4	2010	6130
288.7	2100	6750
292.0	2060	6490
295.3	2180	6550
298.6	2060	6370
301.8	2240	6680
305.1	2270	6430
308.4	2030	6130
311.7	2000	6080
315.0	1990	6130
318.2	2140	6370
321.5	1570	5910
324.8	1570	5860
328.1	1300	6310
331.4	1070	5970
334.7	1100	7040
337.9	1700	7190
341.2	2040	6620
344.5	1420	5970
347.8	1430	5660
351.1	1710	5860
354.3	2110	6680
357.6	2690	7260
360.9	2970	7040
364.2	2730	7040
367.5	1450	5970
370.7	1480	5860
374.0	1610	5970
377.3	1580	6080
380.6	1990	6430
383.9	1830	6680
387.1	2260	6620
390.4	2300	6430
393.7	2570	6550
397.0	2400	6890
400.3	1940	6250
403.5	2150	6370
406.8	1890	6190
410.1	2160	7040
413.4	2430	6190
416.7	2210	6680
420.0	2450	6960
423.2	2680	6750
426.5	2290	6190
429.8	1920	6310
433.1	2250	6550
436.4	1760	6820
439.6	2560	6750
442.9	1980	6250
446.2	2220	6370
449.5	2240	6310
452.8	2330	6310
456.0	2510	6430
459.3	2170	6750
462.6	2550	6020
465.9	2300	6960
469.2	2490	6890
472.4	2370	6490
475.7	2480	6890
479.0	2450	6550
482.3	2350	6620

Table 5. Boring B-1003, Suspension R1-R2 depths and P- and S_H-wave velocities

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
485.6	2650	6820
488.9	2330	6890
492.1	2620	6750
495.4	2490	6820
498.7	2740	6890
502.0	2600	6680
505.3	2480	6620
508.5	2610	7040
511.8	2620	6680
515.1	2530	6680
518.4	2480	6620
521.7	2460	6490
528.2	2740	6890
531.5	3610	8150
534.8	3070	7340
538.1	2620	6550
541.3	2630	6250
544.6	3050	6750
547.9	2730	6750
551.2	2870	6620
555.5	2880	6960
557.7	2580	6890
561.0	2820	6890
564.3	2750	6960
567.6	2660	6960
570.9	2910	7110
574.2	2880	6890
577.4	3110	7430
580.7	3200	7430
584.0	2720	6820
587.3	2740	6890
590.6	2780	7190
593.8	2840	7260
597.1	2930	7040
600.4	2820	6890
603.7	2800	7040
607.0	2770	7590
610.2	2770	7430
613.5	2780	6820
616.8	2780	7430
620.1	2940	6960
623.4	2930	7510
626.6	3280	7430
629.9	2690	7110
633.2	2580	6820
636.5	2690	6960
639.8	2770	7040
643.0	2460	6750
646.3	2640	7340
649.6	3080	7260
652.9	2490	8050
656.2	2930	6890
659.5	2660	6750
662.7	2640	7110
666.0	2620	6750
669.3	2730	6890
672.6	2960	7260
675.9	3010	7770
679.1	3180	7430
682.4	3260	7430
685.7	3090	6960
689.0	2910	6820
692.3	2750	6890
695.5	2760	7340
698.8	3000	6890
702.1	2860	6890
705.4	2800	6890
708.7	2750	7040
711.9	2920	6960
715.2	2770	6820
718.5	2970	7040
721.8	2710	6620
725.1	2820	7040
728.4	2810	7190
731.6	3180	7590
734.9	3330	7510
738.2	2840	7110
741.5	2890	7040
744.8	2760	7190
748.0	2760	7040
751.3	2730	7260
754.6	3240	8350
757.9	3550	7680
761.2	2820	7510
764.4	2870	7510
767.7	3000	7190
771.0	3200	7590
774.3	3080	7430
777.6	2870	7190
780.8	2970	7340
784.1	2930	6960
787.4	3050	7110
790.7	2930	7190
794.0	2970	7260
797.2	2810	7190
800.5	2840	7190
803.8	2740	6960
807.1	2810	6960
810.4	2680	6960
813.7	2690	7040
816.9	2830	7110
820.2	2890	7190
823.5	2870	7040
826.8	2870	7110
830.1	2980	7110
833.3	2890	6960
836.6	3070	7190
839.9	2780	7110
843.2	3050	7340
846.5	2920	7190
849.7	2970	7590
853.0	2880	7190
856.3	2970	7430
859.6	3140	7680
862.9	2840	7510
866.1	3540	8050
869.4	2860	7260
872.7	2680	7510
876.0	3080	7510
879.3	2840	7680
882.6	4130	8790
885.8	4670	9030
889.1	3500	7260
892.4	2570	7260
895.7	2810	8250
899.0	2510	7430
902.2	1880	6620
905.5	2040	6750
908.8	2340	7110
912.1	3140	7680
915.4	3080	7430
918.6	3260	7340
922.2	2710	7260
925.2	2600	7040
928.5	2620	6960
931.8	2460	6820
935.0	2480	6960
938.3	2770	7260
941.6	2910	7040
944.9	2860	7260
948.2	2800	7040
951.4	2420	6490
954.7	2620	7340
958.0	2980	7260
961.3	2930	7260
964.6	2550	6750
967.9	2170	6620
971.1	2670	7340
974.4	2910	7190
977.7	2490	7040

Table 5, continued. Boring B-1003, Suspension R1-R2 depths and P- and S_H-wave velocities

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
981.0	2570	7260
984.3	2410	7340
987.5	2780	7340
990.8	3120	7770
994.1	3230	7770
997.4	3230	7860
1000.7	3140	7960
1003.9	2960	7340
1007.2	2710	7190
1010.5	2280	6820
1013.8	2180	6750
1017.1	2300	6960
1020.3	2430	7110
1023.6	2400	6820
1026.9	2240	6750
1030.2	2160	6750
1033.5	2410	7110
1035.1	2460	7110
1036.8	2480	6890
1038.4	2590	6750
1040.0	2360	6680
1041.7	2330	7040
1043.3	2430	6890
1045.0	2230	6750
1046.6	2180	6890
1047.9	2530	7510
1049.9	3040	8680
1051.5	2710	7860
1053.2	2400	7340
1054.8	2640	7340
1056.4	3090	7300
1058.1	2940	8520
1059.7	2320	8400
1061.4	3210	7660
1063.0	3190	8070
1064.6	3200	8440
1066.3	3380	8440
1067.9	3850	9130
1069.6	3550	9080
1071.2	4470	9230
1072.8	3810	9600
1074.5	4580	9710
1076.1	3940	8750
1077.8	3950	9660
1079.4	4030	10070
1081.0	4300	9180
1082.7	4670	10850
1084.3	4610	10510
1086.0	4670	9490
1087.6	4830	10640

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
1089.2	4660	9330
1090.9	5550	10250
1092.5	5500	10850
1094.2	5520	11370
1095.8	5350	13370
1097.4	4900	8890
1099.1	5350	11520
1100.7	6220	13700
1102.4	5410	11770
1104.0	4860	10190
1105.6	4810	10510
1107.3	4560	10920
1108.9	4880	10250
1110.6	5100	10000
1112.2	4930	9180
1113.9	4950	10310
1115.5	5060	10920
1117.1	5410	10380
1118.8	6620	12950
1120.4	6490	10000
1122.1	5660	12290
1123.7	5010	11140
1125.3	5030	10380
1127.0	5990	9830
1128.6	6580	14160
1130.3	5910	12750
1131.9	6100	11930
1133.5	6310	14660
1135.2	5220	12560
1136.8	5060	11070
1138.5	4950	10510
1140.1	4740	9180
1141.7	4520	9550
1143.4	5060	9890
1145.0	4900	10510
1146.7	5940	12950
1148.3	5860	12660
1149.9	5300	11290
1151.6	4910	10380
1153.2	4580	11140
1154.9	4550	10850
1156.5	5260	9950
1158.1	4350	8150
1159.8	5500	10190
1161.4	6890	11680
1163.1	9030	15190
1164.7	7550	13050
1166.3	6960	11140
1168.0	8100	15050
1169.6	8000	10710

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
1171.3	6820	13050
1172.9	6220	10920
1174.5	6680	13050
1176.2	7150	13370
1177.8	7110	12850
1179.5	7110	12750
1181.1	5500	10850
1182.7	4880	10310
1184.4	5180	11070
1186.0	5590	11210
1187.7	5100	10380
1189.3	5120	10310
1190.9	5370	10710
1192.6	5620	11290
1194.2	5500	11290
1195.9	5200	10570
1197.5	5140	10710
1199.2	5990	11290
1200.8	6130	12200
1202.4	5330	10640
1204.1	5480	10510
1205.7	5370	10570
1207.4	5500	10920
1209.0	6130	11680
1210.6	6750	12110
1212.3	7230	12850
1213.9	7640	13160
1215.6	8150	14920
1217.2	7470	14530
1218.8	6550	11850
1220.5	6310	11770
1222.1	7230	13920
1223.8	7820	15330
1225.4	8570	12110
1227.0	8570	14920
1228.7	8050	13580
1230.3	7040	12950
1232.0	6370	12020
1233.6	5790	12560
1235.2	5810	11290
1236.9	6280	12380
1238.5	7300	14040
1240.2	7190	12850
1241.8	7470	12380
1243.4	6960	12560
1245.1	6520	12200
1246.7	6490	12110
1248.4	6680	13260
1250.0	6720	12200
1251.6	6330	12290

Table 5, continued. Boring B-1003, Suspension R1-R2 depths and P- and S_H-wave velocities

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
1253.3	6370	11370
1254.9	7070	11930
1256.6	7470	13810
1258.2	6960	12850
1259.8	7110	13580
1261.5	7510	12850
1263.1	8350	12560
1264.8	9350	18360
1266.4	7770	16220
1268.0	7150	13260
1269.7	6750	15330
1271.3	6490	14530
1273.0	7860	14790
1274.6	8150	13160
1276.3	7260	14660
1277.9	8300	14920
1279.5	6750	12850
1281.2	7470	13580
1282.8	7960	14660
1284.5	7770	13370
1286.1	8200	16070
1287.7	7590	12750
1289.4	8300	13810
1291.0	7230	13920
1292.7	6050	11600
1294.3	6490	11930
1295.9	7070	12290
1297.6	6960	12470
1299.2	7590	13700
1300.9	7190	14920
1302.5	7430	13810
1302.5	7510	14530
1304.1	8050	14530
1305.8	8350	16300
1307.4	7380	14660
1309.1	7190	18360
1310.7	7340	13160
1312.3	7380	16880
1314.0	7510	12660
1315.6	8250	13470
1317.3	7820	15760
1318.9	6430	12020
1320.5	6130	11850
1322.2	5990	12290
1323.8	5860	11520
1325.5	5970	11520
1327.1	6520	12380

Table 5, continued. Boring B-1003, Suspension R1-R2 depths and P- and S_H-wave velocities

Plant Vogtle Borehole B-1004
Receiver to Receiver V_s and V_p Analysis

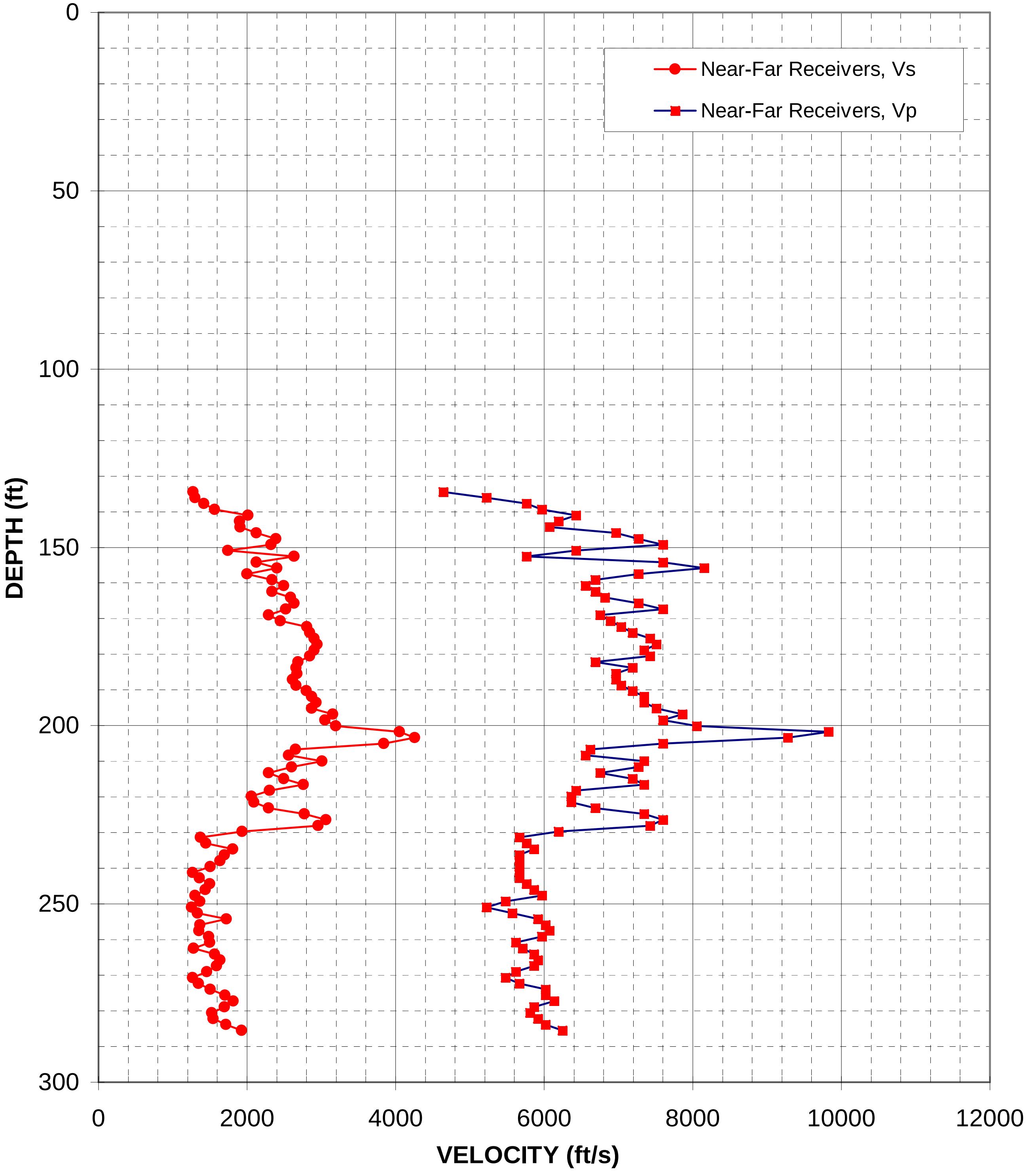

Figure 9. Boring B-1004, Suspension R1-R2 P- and S_H-wave velocities

Depth (ft)	V_s (ft/sec)	V_p (ft/sec)
134.5	1270	4640
136.2	1300	5220
137.8	1420	5760
139.4	1560	5970
141.1	2010	6430
142.7	1900	6190
144.4	1910	6080
146.0	2130	6960
147.6	2390	7260
149.3	2320	7590
150.9	1740	6430
152.6	2630	5760
154.2	2130	7590
155.8	2400	8150
157.5	2000	7260
159.1	2340	6680
160.8	2490	6550
162.4	2340	6680
164.0	2590	6820
165.7	2630	7260
167.3	2520	7590
169.0	2290	6750
170.6	2450	6890
172.2	2810	7040
173.9	2840	7190
175.5	2910	7430
177.2	2940	7510
178.8	2910	7340
180.5	2840	7430
182.1	2680	6680
183.7	2660	7190
185.4	2670	6960
187.0	2610	6960
188.7	2660	7040
190.3	2800	7190
191.9	2870	7340
193.6	2930	7340
195.2	2870	7510
196.9	3150	7860
198.5	3050	7590
200.1	3200	8050
201.8	4050	9830
203.4	4260	9280
205.1	3840	7590
206.7	2650	6620
208.3	2560	6550
210.0	3010	7340
211.6	2600	7260
213.3	2290	6750
214.9	2490	7190
216.5	2760	7340
218.2	2300	6430
219.8	2060	6370
221.5	2100	6370
223.1	2290	6680
224.7	2770	7340
226.4	3070	7590
228.0	2960	7430
229.7	1930	6190
231.3	1380	5660
232.9	1450	5760
234.6	1810	5860
236.2	1700	5660
237.9	1640	5660
239.5	1510	5660
241.1	1270	5660
242.8	1360	5660
244.4	1500	5760
246.1	1440	5860
247.7	1300	5970
249.3	1370	5480
251.0	1250	5220
252.6	1330	5570
254.3	1720	5910
255.9	1360	6020
257.6	1350	6080
259.2	1490	5970
260.8	1500	5620
262.5	1280	5710
264.1	1560	5860
265.8	1640	5910
267.4	1590	5860
269.0	1460	5620
270.7	1270	5480
272.3	1350	5660
274.0	1510	6020
275.6	1700	6020
277.2	1820	6130
278.9	1700	5860
280.5	1530	5810
282.2	1540	5910
283.8	1720	6020
285.4	1930	6250

Table 6. Boring B-1004 Suspension R1-R2 depths and P- and S_H-wave velocities

Plant Vogtle Borehole C-1005A
Receiver to Receiver V_s and V_p Analysis

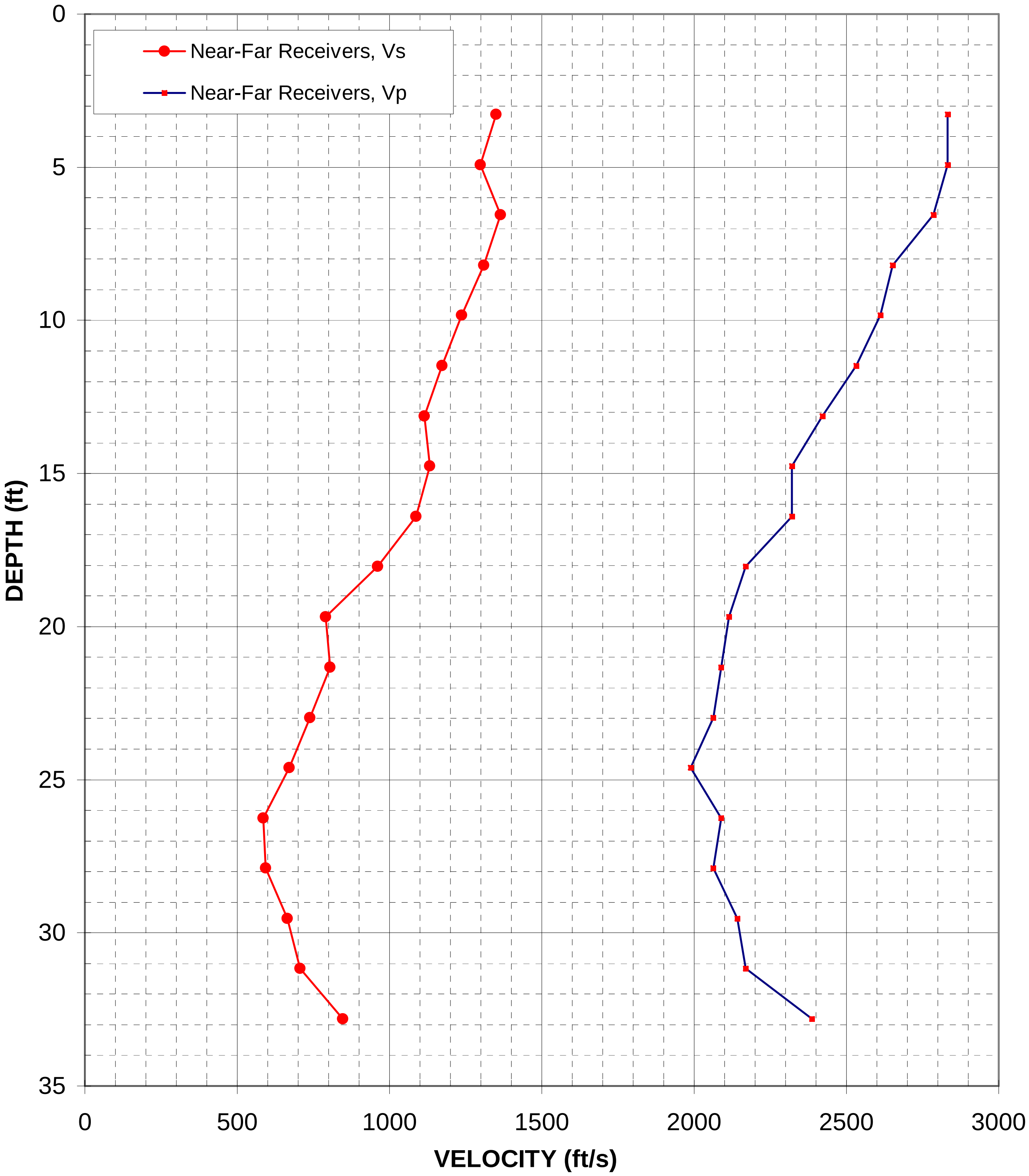

Figure 10. Boring C-1005A, Suspension R1-R2 P- and S_H-wave velocities

Depth (ft)	**V_s** (ft/sec)	**V_p** (ft/sec)
3.3	1350	2830
4.9	1300	2830
6.6	1360	2780
8.2	1310	2650
9.8	1240	2610
11.5	1170	2530
13.1	1110	2420
14.8	1130	2320
16.4	1090	2320
18.0	960	2170
19.7	790	2110
21.3	810	2090
23.0	740	2060
24.6	670	1990
26.3	590	2090
27.9	590	2060
29.5	670	2140
31.2	710	2170
32.8	850	2390

Table 7. Boring C-1005A, Suspension R1-R2 depths and P- and S_H-wave velocities